



Proceedings

Proceedings of Full Papers Only

Final Program

10th Annual International Conference on Industrial Engineering and Operations Management

Dubai, United Arab Emirates (UAE)

March 10–12, 2020

Venue: Hyatt Regency Dubai

[Virtual Event Details - CLICK HERE](#)

[Faculty Jobs
Announcement](#)

[Flyer - Supply Chain
and Logistics
Competition](#)

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IEOM Papers](#)

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Photos of Past Events

- 2019 Bangkok
- 2018 South Africa
- 2018 Washington DC
- 2018 Paris



IEOM Society International

March 1, 2020

Important Announcement for All Participants of the 2020 IEOM Society Dubai Conference

Dear IEOM Dubai Conference Participants:

As many of you are aware, there is currently an international health crisis caused by the Coronavirus. The impact of this crisis has been felt around the globe. Your IEOM Society has monitored this situation very closely. We have also discussed this health emergency with members of our Global Council. The number of countries that are affected by the Coronavirus is significant. Each country is addressing the virus in a different manner.

The United Arab Emirates (UAE) has placed travel restrictions on flights entering their country and some restrictions in the events internally ("Dubai: The Ministry of Education has announced that all school trips, activities and events will be suspended as part of precautionary steps to limit the spread of coronavirus," Feb. 29, Gulf News). Some neighboring countries have also flight restrictions. The IEOM Society is deeply concerned with the health and safety of its members and others who will be attending the Dubai conference next week. Therefore, the IEOM Society Global Council and our Board of Directors has recommended that the conference be held as a virtual event.

A combination of virtual and recorded presentations will be used for the 10th IEOM Society Annual Dubai Conference, March 10-12, 2020. It may be necessary to have additional presentations on days beyond the schedule. Competitions will be conducted virtually as well. All papers will be published online and sent to Scopus for indexing.

The original conference programs have been printed and will be sent by mail to each registered participant. Following the conference, awards, best track papers and chapter recognitions will be mailed. The link required for you to participate in the conference will be provided shortly.

The IEOM Society regrets that this decision was necessary, but we believe it was the prudent action to take in light of the present global health dilemma. We trust that you will agree with this decision as the Coronavirus has become a very serious worldwide threat.

We are sorry for your inconveniences. Most airlines are giving refund due to virus issues. We hope virus issues will go away soon. We wish you all the best.

We look forward to your participation in the 10th IEOM Society International Dubai Conference.

Thank you for your understanding.

Sincerely,

Ahad Ali, Ph.D.
Executive Director
The IEOM Society International

Professor Don Reimer
Director of Membership and Chapter Development
IEOM Society International

Industrial Engineering and Operations Management Society International (IEOM Society International)
21415 Civic Center Dr., Suite # 217, Southfield, Michigan 48076, USA, Phone: 1-248-450-5660, www.ieomsociety.org

Please contact info@ieomsociety.org for any questions or virtual conference details.

Theme: Operational Excellence in the era of Industry 4.0

Competition Submissions deadline is January 31, 2020

Submission Link: <https://www.xcdsystem.com/IEOM/abstract/index.cfm?ID=ZY00ywj>

Registration Link:
<https://www.xcdsystem.com/IEOM/attendee/index.cfm?ID=EeYw4JD>

IEOM Society International, a 501(c)(3) non-profit organization, is a premier international platform and forum for academics, researchers, scientists and practitioners to exchange ideas and provide insights into the latest developments and advancements in the fields of Industrial Engineering and

- 2018 Bandung-1
- 2018 Bandung-2
- 2017 Dhaka
- 2017 Bogota
- 2017 Bristol, UK
- HS/MS STEM Poster Competition 2017
- 2017 Morocco Photos
- 2016 Detroit Photos
- 2016 Malaysia Photos
- 2015 Orlando Photos
- 2015 Dubai Photos
- 2014 Bali Photos
- 2012 Istanbul Photos

NEWS

Binghamton University Join as a Partner University

Upcoming Conferences

- Czech Republic
- GCC in Riyadh
- Dubai
- San Paulo
- Rome
- Monterrey
- Singapore

Past Conferences

- Bangkok, March 2019
- Pretoria, October 2018
- Washington DC, Sept. 2018
- Paris, July 2018
- Bandung, March 2018

Operations Management. IEOM has successfully organized international conferences in Dhaka (2010), Kuala Lumpur (2011), Istanbul (2012), Bali (2014), Dubai (2015), Orlando (2015), Kuala Lumpur (2016), Detroit (2016), Rabat (2017), Bristol, UK (2017), Bogota (2017), Bandung (2018), Paris (2018), Washington DC (2018), Pretoria (2018), Bangkok (2019), Pilsen (2019), Toronto (2019) and Riyadh (2019). IEOM Society will be organizing the 10th International Conference on Industrial Engineering and Operations Management (IEOM) to be held at Hyatt Regency Hotel in Dubai during March 10–12, 2020. Last Dubai Conference in 2015 has more than 500 participants. We would be expecting 400–500 people from more than 60 countries.

[PAPER \(docx\) – Paper / Abstract Template – ABSTRACT \(docx\)](#)

Some the events and activities that are planned include: keynote speakers, global engineering education track, industry solutions track, women in industry and academia track, undergraduate student paper competition sponsored by Siemens, graduate student paper competition sponsored by Eaton, Doctoral Dissertation Competition, Masters Thesis Competition, Simulation competition, senior design project poster competition, undergraduate research competition, high school STEM competition, panel sessions, recognition and awards, exhibition, poster, IEOM student and professional chapter activities and tours.

[Call for Papers Flyer](#)

All papers are subject to double peer review. IEOM Template must be followed. **Accepted papers will be indexed in SCOPUS.** Presentation can be delivered with abstract only. Full paper is optional.

Topics covering industrial issues/applications and theoretical research, but are not limited to:

- Artificial Intelligence
- Automation and Control
- Business Management
- Case Studies
- Construction Management
- Cyber Security
- Data Analytics and Big Data
- Decision Sciences
- Defense
- Design and Analysis
- E-Business/E-Service
- E-Manufacturing
- Energy
- Engineering Education
- Engineering Management
- Entrepreneurship and Innovation
- Environmental Engineering
- Financial Engineering
- Healthcare Operations and Healthcare Engineering
- Human Factors and Ergonomics
- Industrial Management
- Industry 4.0
- Industry Best Practices
- Information Technology
- Inventory Control
- IoT
- Lean Six Sigma
- Logistics
- Maintenance Services
- Manufacturing
- Modeling and Simulation

[IEOM 2017 Bogota](#)

Marriott Hotel
October 25–26,
2017

[IEOM 2017 UK](#)

UWE Business
School, Bristol
July 24–25, 2017

[IEOM 2017 Morocco](#)

Sofitel Hotel Rabat
April 11–13, 2017

[IEOM 2016 Detroit](#)

Lawrence Tech
Campus
September 23–25,
2016

[IEOM 2016 Malaysia](#)

JW Marriott KL Hotel
March 8–10, 2016

[IEOM 2016 Detroit](#)

Lawrence Tech
University
September 23–25,
2016

[IEOM 2015 Orlando](#)

Rosen Plaza Hotel
September 10–11,
2015

[IEOM 2015 Dubai](#)

Hyatt Regency Hotel
March 3–5, 2015

[IEOM 2014 Bali](#)

Grand Hyatt Hotel
January 7–9, 2014

[IEOM 2012 Istanbul](#)

Istanbul Technical
University
July 3–6, 2012

[IEOM 2011 Kuala Lumpur](#)

Season Four Hotel
January 22–24, 2011

[IEOM 2010 Dhaka](#)

IUT, Bangladesh
January 7–9, 2010

- Operations Excellence
- Operations Management
- Operations Research
- Product Lifecycle Management (PLM)
- Production Engineering
- Production Planning and Management
- Project Management
- Quality and Reliability
- Service Engineering and Service Management
- Supply Chain Management
- Sustainability
- Systems Dynamics
- Systems Engineering
- Technology Management
- Transportation and Traffic
- Waste
- Work Design, Measurement and ISO

Special Tracks

- [Global Engineering Education](#)
- [Industry Solutions](#)
- Women in Industry and Academia
- Industry 4.0

DUBAI Tourist Attractions

- **Burj Khalifa:** Burj Khalifa is a skyscraper in Dubai and with its height of 829.84 m is the tallest manmade structure in the world.
- **Burj Al Arab:** One of the most luxurious, and with height of 321m, it is fourth tallest hotel in the world; one of the most photographed monuments in the world and is recognized as the symbol of Dubai.
- Palm Island Dubai (Jumeirah Palm Island): one of the most ambitious real-estate developments on earth, heralded as the 8th wonder of the world.
- **Dubai Mall**
- **Dubai Fountain**
- **Dubai Aquarium**
- **Desert Safari:** One of the most visited and famous activities in Dubai are desert safari tours. Safari tours in Land Cruisers and Hummers take visitors right into the heart of the desert where they experience the excitement of a roller-coaster tour down the astonishing high dunes (dune bashing).
- **Dubai Marina**
- **Dubai Museum**
- **Jumeirah Mosque**
- **Gold and Spice Souks**
- **Dubai Walking Tour:** Bastakiya, Dubai Creek, Shindagha and Old Deira
- **Near to Dubai:** Abu Dhabi, Bahrain, Qatar, Dammam (Saudi Arabia) and Muscat are less than one hour flight
- Umrah packages lead by Dr. Abdul Talib Bon, UTHM, Malaysia (less than 2 hours flight from Dubai). Malaysian can get e-Visa for Saudi Arabia and other countries can use Umrah visa.

IEOM Conference Proceedings
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- [Bangkok 2019](#)
- [Pretoria 2018](#)
- [Washington DC 2018](#)
- [Paris 2018](#)
- [Bandung 2018](#)
- [Bogota 2017](#)
- [Bristol \(UK\) 2017](#)
- [Morocco 2017](#)
- [Detroit 2016](#)
- [Kuala Lumpur 2016](#)
- [Orlando 2015](#)
- [Dubai 2015](#)
- [Bali 2014](#)
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- [KL 2011](#)
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[Launch of Women in Industry and Academia Video](#)

[IEOM Women in Industry and Academia Forum](#)



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Submissions Received from Following Countries and Territories

Important Dates

Paper submission deadline: **November 25, 2019**

Notification of acceptance: **November 30, 2019**

Registration deadline: **December 20, 2019**

Conference: **March 10–12, 2020**

Conference Chairs

- **Dr. Zain Tahboub**, Chief Advisor, Dubai Aviation Engineering Projects, Dubai, United Arab Emirates
- **Dr. Ahad Ali**, Lawrence Technological University, Michigan, USA
- **Dr. Mohammed Shamsuzzaman**, Associate Professor, Department of Industrial Engineering & Engineering Management Dept., University of Sharjah, UAE

- University of Sharjah, UAE
- Zayed University, Dubai, UAE
- Binghamton University, The State University of New York (SUNY), USA
- Chiang Mai University, Thailand
- Center for Advanced Systems Research and Education (CASRE), University of Tennessee, Knoxville, USA
- Eastern Michigan University, USA
- Lawrence Technological University, Michigan, USA
- Prince Sultan University, Riyadh, Saudi Arabia
- University of Derby, UK
- University of the District of Columbia (UDC), Washington, DC, USA
- University of New Brunswick at Fredericton, Canada
- University of the District of Columbia, Washington, DC, USA
- Universite De Lorraine, Nancy cedex – France
- Wayne State University, Detroit, Michigan, USA
- Universitas Sebelas Maret, Surakarta, Indonesia
- Universiti Tun Hussein Onn Malaysia (UTHM)
- EMI, Mohammed V University, Rabat, Morocco

- Eaton Corporation
- SIEMENS
- EFR Certification
- Emirates (as an official airline partner)

- ASQ Middle East Africa
- African Engineering Education Association (AEEA)
- BKSTI: Agency for Cooperation of Higher Education of Industrial Engineering, Indonesia
- Indian Institute of Industrial Engineering (IIIE)
- International Federation of Engineering Education Societies (IFEES)
- Pakistan Society of Industrial Engineering (PSIE)
- Society of Cost and Quality Engineers (SCQE)

Tourist Attractions:

Attendance Certificates will be provided for conference participants. Continuous Education Unit (CEU) is available. IEOM Society International will provide some awards and recognition at the 10th IEOM Dubai Conference.

Contact: info@ieomsociety.org

- Program – IEOM 2019 Riyadh
- Program – IEOM 2019 Toronto
- Program – IEOM 2019 Pilsen
- Program – Bangkok 2019
- Program – Pretoria 2018
- Program – IEOM 2018 Washington DC
- Program – IEOM 2018 Paris
- Program – IEOM 2018 Bandung
- Program – IEOM 2017 Bogota
- Program – IEOM 2017 UK (Bristol)
- Program – IEOM 2017 Rabat, Morocco
- Program – IEOM 2016 Detroit
- Program – IEOM 2016 Kuala Lumpur
- Program – IEOM 2015 Orlando
- Program – IEOM 2015 Dubai
- Program – IEOM 2014 Bali
- Program – IEOM 2012 Istanbul
- Program – IEOM 2011 Malaysia
- Program – IEOM 2010 Dhaka

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Proceedings

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ID 001 Sustainable Quality Culture: Company-Wide Management System (CWMS) and Lean Six Sigma (LSS) as Enablers

Souraj Salah, Faculty of Business Administration, Hamdan Bin Muhammad Smart University, Dubai, UAE

ID 013 Leadership for Lean Six Sigma

Alessandro Laureani, University of Strathclyde, Glasgow, Scotland, UK

ID 016 Identification & Awareness About The Development Of Breast Cancer By Using Raman Spectroscopic Method

Priya Sachin Deole., Department of physics, G.S. Tompe Art's, Commerce & Science College, Chandur Bazar, Dist. Amravati (M.S) India

Nachiket Deole, Manasi Vyankatesh Ghamande., Vishwakarma institute of technology, Pune, Maharashtra, India

ID 018 Cyber-Physical Systems: Matching Up its Application in the Construction industry and other Selected Industries

Matthew Ikuabe, Clinton Aigbavboa, Ayodeji Oke, University of Johannesburg, Johannesburg, Guateng, South Africa

ID 019 Adoption of Building Information Modelling (BIM) in Small and Medium Enterprise (SMEs) Construction Companies in Iraq

Abdussalam Shibani, Khaled Abu Awwad, Michel Ghostin, Coventry university, Coventry, United Kingdom

Kalim Siddiqui, Senior lecturer in Economics, Department of Accounting, finance and Economics, Huddersfield Business School

Omar Farji Coventry university, Coventry, United Kingdom

ID 020 Investigating the Barriers of Building Information Modelling (BIM) implementation in the Higher Education in Morocco

Abdussalam Shibani, Khaled Abu Awwad, Michel Ghostin, Coventry university, Coventry, United Kingdom

Kalim Siddiqui, Senior lecturer in Economics, Department of Accounting, finance and Economics, Huddersfield Business School

Firdaouss Sidqui, Coventry university, Coventry, United Kingdom

ID 023 Preparing International Engineering Programs for Accreditation

Albertus Retnanto, Texas A&M University at Qatar Doha Qatar,

Hamid R. Parsaei, Ph.D., P.E. Professor, Department of Industrial and Systems Engineering Texas A&M University,

Boback, Parsaei Integrated Technology Systems, Inc. Houston, Texas

ID 024 Building Communication Strengths and Skills for Non-native English Speaking Engineering Students

Albertus Retnanto, Texas A&M University at Qatar Doha Qatar,

Hamid R. Parsaei, Ph.D., P.E. Professor, Department of Industrial and Systems Engineering Texas A&M University,

Boback, Parsaei Integrated Technology Systems, Inc. Houston, Texas

ID 026 The Use of Unified Theory of Acceptance and Use of Technology in the Adoption of M-Payment

Rindang Widuri, Bina Nusantara University, West Jakarta, DKI Jakarta, Indonesia

Muhammad Kholil Industrial Engineering, Faculty of Engineering Universitas Mercu Buana, Jakarta, Indonesia

Rara Ganish Kharisma Nurbani, Industrial Engineering, Faculty of Engineering, Universitas Mercu Buana, Jakarta, Indonesia

Hendri, Electrical Engineering, Faculty of Engineering, Universitas Mercu Buana, Jakarta, Indonesia

ID 027 Efficient Identification Model of Strategic Key Dimensions in SMEs

Jean-Marc Vasnier, Mourad Messaadia, Ecole d'ingénieurs Ei.Cesi, Saint-Nazaire, France

Nicolas Maranzana, Ameziane Aoussat, Arts et Métiers – LCPI, Paris, France

ID 028 Improve computation performance on large optimization problems through heterogeneous computing

Gary Yu-Hsin Chen, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan, Chinese Taipei

Ping-Shun Chen, Department of Industrial and Systems Engineering, Chung Yuan Christian University, Chung Li, Taiwan

ID 029 Applying Data Mining Methods to Classify Outpatients' Examination Time

Ping-Shun Chen, Chin-Hui Lai, Ying-Tzu Chen, Yu-Ju Lu, Chung Yuan Christian University Taoyuan city International Taiwan

Gary Yu-Hsin Chen, Department of Logistics Management National Kaohsiung University of Science and Technology

Kaohsiung 82445, Taiwan

ID 030 An intuitionistic fuzzy MCDM framework for selecting environmentally responsible freight transport service provider: A transport service buyer perspective

Aalok Kumar, Ramesh A., IIT Roorkee, Roorkee, India

ID 031 Outpatient Nurse Scheduling under the New Labour Law: Difficulties and Challenges Indicated by a Negative Case Study

Zheng-Yun Zhuang, National Kaohsiung University of Science and Technology, Kaohsiung, Chinese Taipei

Yu-Kuang Hsieh, Management Department, Antai Tian-Sheng Memorial Hospital, An-Tai Medical Care Corporation,

Donggang, Pingtung 928, Taiwan

Tien-Hwa Ho, Department of Information Management, Yuanpei University of Medical Technology, Xiangshan, Taiwan

ID 032 Design and Implementation of city car scale electric vehicle powered by Brushless DC Motor

Agus Ulinuha, Ibnu Shokhibul Khak, and Dimas Septian Dwi, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

ID 033 Towards Developing Quality Standards: A review for managing South Africa's Carbon Emissions

P Naidoo, Nita Sukdeo, University of Johannesburg, Johannesburg, Gauteng, South Africa

S Zuma, Eskom, Technology Division

ID 034 A Lean 7S methodology framework to improve efficiency and organizational performance: A review study in an SME organization

K. Mahlaha, Nita Sukdeo and V. Mofokeng, Department of Quality and Operations Management, University of Johannesburg,

Gauteng, South Africa

ID 035 To Investigate the Relationship between TQM Enablers Applicable In Indian Engineering Education Institutes

Ankesh Mittal, Pardeep Gupta, Manjot Singh, Department of Mechanical Engineering, SLIET sunam Punjab India

ID 037 Artificial Intelligence Technique For Detecting Bone Irregularity Using Fastai

Meghna Hooda, Shrivankumar Bachu, Surjeet Dalal, SRM University, Delhi NCR, India

Piya Ghosh, Department of Industrial and Management Engineering, Indian Institute of Technology, Kanpur, Uttar Pradesh

ID 038 Analysis of Schedule Rates for Bridge and Road Works in India using Solid Transportation Problem

Piya Ghosh, Industrial and Management Engineering Department, Indian Institute of Technology, Kanpur, India

Meghna Hooda, SRM University, Delhi NCR, Haryana, India

ID 039 Evaluation of Variability in Clinical Assessments

Alyaa Alyaarbi, Saleh Atatreh, Afraa Alsereidi, Noora Alblooshi, Sumaya Almaazmi, Raja Jayaraman, Mecit Can Emre Simsekler, Khalifa University, Abu Dhabi, UAE

Zehra Canan Araci, Abu Dhabi School of Management, Abu Dhabi, UAE Samer Ellahham, Heart & Vascular Institute,

Cleveland Clinic Abu Dhabi, Abu Dhabi, UAE

ID 040 Cross Docking Network with Multiple Types of Trucks

Takashi Irohara, Sophia University, Chiyoda-ku, Tokyo, Japan

ID 055 Optimal Periodic Preventive–Maintenance Policy For A System Where Its Failure/Repair Follows The Non–Homogeneous Pure Birth Process

Yu–Hung Chien, Wen–Ting Chang, Department of Applied Statistics, National Taichung University of Science and Technology, Taichung, Taiwan

ID 056 Exploring the Adoption of Digital Technology at the Different Phases of Construction Projects in South Africa

Matthew Ikuabe, Douglas Aghimien, Clinton Aigbavboa and Ayodeji Oke, University of Johannesburg, Guateng, South Africa

ID 057 Screening Variables using Computer Experiments: An application using a simulated furnace

Nuno Costa, Paulo Fontes, IPS–EST, Setubal, Portugal

ID 063 The Approaches for Resolving Conflicts At The Different Lifecycle Of The Project: A South African Perspective

Matthieu Bodika, Clinton O. Aigbavboa, Ifije Ohiomah, University of Johannesburg, South Africa

ID 064 The Impact of Command Buttons, Entry Fields, and Graphics on Single Usability Metric (SUM)

Gabriel John L. de Leon, Joana Patrice M. Gratuito, Ronaldo V. Polancos, Industrial Engineering Department, De La Salle University, Manila, Philippines

ID 065 The Interactional Effects of Page Layout, User Workload, and Lists in Improving the Single Usability Metric

Gabriel John L. de Leon, Joana Patrice M. Gratuito, Ronaldo V. Polancos, Industrial Engineering Department, De La Salle University, Manila, Philippines

ID 066 Multi–cyclic scheduling of identical parts in an N–machine no–wait robotic cell

DHIRENDRA PRAJAPATI, Arjun R Harish, Saurabh Pratap, PDPM IITDM Jabalpur, Jabalpur, M.P, India,
Mengdi Zhang, School of Internet of Things , Nanjing University of Posts and Telecommunications, Nanjing 210003, People's Republic of China,
Yash Daultani, Department of Operations Management, Indian Institute of Management, Lucknow, India.

ID 076 Humanitarian Engineering Initiative of Texas A&M University at Qatar; A Case Study of a Series of Successful Workshops to Enhance the Sense of Social Responsibility of Engineering Students

Sara Amani, Zohreh Eslami and Hassan Bashir, Mahmood Amani, Texas A&M University, Doha, Qatar

ID 077 Spare Parts Inventory Replenishment by Utilization of End–of–Use Returns: Case of Smartphones

Vaibhav Agrawal, Dr. Akhilesh Kumar, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India

ID 078 A Review on City Logistics and Two Echelon Freight Modelling

Marita Madhavi Warnakulasuriya, D.H.H. Niwunhella, L.D.J.F. Nanayakkara and Ruwan Wickramarachchi, University of Kelaniya – Sri Lanka, Daluagama, Sri Lanka

ID 079 Optimization Models in Aircraft Assignment and Airline Disruption Management – A Systematic Review of Literature

P.A. Fernando, D.H.H. Niwunhella, L.D.J.F. Nanayakkara, R. Wickramarachchi, University of Kelaniya, Kelaniya, Western Province, Sri Lanka

ID 081 Implementing a Cross–Docking System in Warehouse – A Systematic Review of Literature

Neerajie Ahangamage, D. H. H. Niwunhella, Kasuni Vidanagamachchi, Ruwan Wickramarachchi, Department of Industrial Management, Faculty of Science, University of Kelaniya, Kelaniya, Western Province, Sri Lanka

ID 082 Accounting Students 'Interest In Chartered Accountant Accounting Profession (Empirical Study of Accounting Students at State and Private Universities)

Cory Paulina, Agus Dwi Sasono, Rony Wardhana, Nurul Aini, Rudi Harianto, Ariyani, Faculty Economy and Business, Narotama University, Surabaya, Indonesia
Abdul Talib Bin Bon, Fakulti Pengurusan Teknologi dan Perniagaan, Universiti Tun Hussein Onn Malaysia (UTHM), Johor, Malaysia

ID 083 An Innovative Framework To Measure The Maturity Level of Core Soft Skills and Competencies (SSCM) Needed by Project Managers in Oil and Gas Industry

Nasr Al Hinai, Esra Abusharkh, Asila Al-Shamli, Emad Summad, Sultan Qaboos University, Alkhoud, Muscat, Oman

ID 086 Proposal of optimal discount price of ready meal considering the expiration date

Yu Wakabayashi, Logistics Development Center, Kao Corporation, Tokyo, Japan

Takaaki Kawanaka, The University of Tokyo, Tokyo, Japan

Takahiro Ohno, Department of Industrial & Management Systems Engineering, School of Creative Science and Engineering, Waseda University, Tokyo, Japan

ID 088 Integrating Voice-Activated Digital Assistants with Smart Home Technologies to Support People with Long-Term Mobility Disabilities: Needs-Assessment, Product-Selection and Implementation

L. Koon, R. Khaleghi, K.A. Blocker, W.A. Rogers, Ramavarapu Sreenivas, University of Illinois at Urbana-Champaign, Urbana, IL, United States

ID 089 BREXIT: Assessing the Impact on the UK Construction Industry & Mitigating Identified Risks

Danielle Smith, Northumbria University, London, UK

Vian Ahmed, Sara Saboor, American University of Sharjah, Sharjah, United Arab Emirates

ID 091 Developing a Rectifying Inspection Plan with Repetitive Group Sampling Based on Loss-based Capability Index

Chieh-hui Ku, Chien-Wei Wu, National Tsing Hua University, Hsinchu city, Taiwan

ID 092 A New Variable-type Skip-lot Sampling Plan Based on the Process Capability Index

I-Ting Wei, Chien-Wei Wu, National Tsing Hua University, Hsinchu city, Taiwan

ID 093 Generalized Confidence Intervals for Assessing Process Performance based on Quality Yield Index

Meng-Tzu Lin, Chien-Wei Wu, National Tsing Hua University, Hsinchu city, Taiwan

ID 095 Identification of the Automotive Manufacturing Change Point Approaching Panel Data

Karim Atashgar, Naser Rafiee, Malek Ashtar University of Technology, Tehran, Iran

ID 096 Optimal promotional policy in innovation diffusion model considering brand image in segmented specific market

Pradeep Kumar, Kuldeep Chaudhary, Kanika Sardana, Department of Applied Mathematics, Amity University, Uttar Pradesh, India

ID 097 Indicator distance and color effects in comprehension of multiple time series graph

Rosemary Seva, Katrina Chinjen, Nicole Estoista, Judy Ann Wu, Industrial and Systems Engineering Department, De La Salle University, Manila, Philippines

ID 098 Vehicle Routing Problem for Multi-Product Cross-Docking

Aldy Gunawan, Audrey T. Widjaja1, Benjamin Gan Kok Siew, Singapore Management University, Singapore

Vincent F. Yu, Panca Jodiawan, Department of Industrial Management, National Taiwan University of Science and Technology, Taipei, Taiwan

ID 099 Measure of Bullwhip Effect in a Closed-loop Supply Chain with Two Retailers under Price-sensitive non-ARMA Demand Process

Bibhas Giri, Jadavpur University Kolkata West Bengal India

ID 100 Analysis Model of Communication Network under Complexity

Nyunho Jung, The University of Fukuchiyama, Fukuchiyama, Kyoto, Japan

Takaaki Kawanaka, Institute for Innovation in International Engineering Education, Graduate School of Engineering, The University of Tokyo, Tokyo, Japan

Hiroshi Yamashita, Department of Commerce, Meiji University, Tokyo, Japan

ID 101 Systematic Review of Literature on Lean and Six Sigma in Healthcare and Directions for Future Research

Rodrigo E. Peimbert-García, Tecnológico de Monterrey / Macquarie University, Monterrey / Sydney, New South Wales, Mexico

Timothy Matis, Department of Industrial Engineering, Texas Tech University, Lubbock, USA

Jonathan Cuevas-Ortuño, Tecnológico de Monterrey / Macquarie University, Monterrey / Sydney, New South Wales, Mexico

Samuel M. Nucamendi-Guillen, Department of Industrial Engineering, Universidad Panamericana, Guadalajara, Mexico

ID 109 Monitoring a cold rolling process using Xbar&EWMA charts

Mohammad Shamsuzzaman, Salah Haridyb, Hamdi Bashird, Imad Alsyoufc, University of Sharjah, Sharjah, United Arab Emirates

ID 110 Optimization design of economic EWMA control chart based on random process shifts

Mohammad Shamsuzzaman, Salah Haridyb, Hamdi Bashird, Imad Alsyoufc, University of Sharjah, Sharjah, United Arab Emirates

ID 111 System Dynamics Applications in Healthcare: A Literature Review

Jesús Isaac Vázquez-Serrano, School of Engineering and Sciences, Tecnológico de Monterrey, Monterrey, NL 64849, Mexico
Rodrigo E. Peimbert-García, School of Engineering and Sciences, Tecnológico de Monterrey, Monterrey, NL 64849, Mexico /
School of Engineering, Macquarie University, Sydney, NSW 2109, Australia

ID 112 Optimal Integrated Maintenance, Production and Spare Parts Strategy for Wind Turbines System

Faker Abderrahmane and Bouslikhane Salim, Electrical Engineering Department, Universiapolis, Agadir, Morocco
Hajej Zied, Université de Lorraine, METZ, France

ID 113 Impact of Intellectual Capital on the Performance of Higher Education Institutions

Chandan Jha, Amit Sachan, Arnab Adhikari, Sayantan Kundu, Indian Institute of Management Ranchi, India

ID 125 Modeling a Bi-Objective Multi-Skill Resource-Constrained Project Scheduling Problem to Minimize Project Makespan and Skill Divergence Span

Dheeraj Joshi, Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur, India
M.L. Mittal, Manish Kumar, Professor, Deptt. of Mechanical Engineering, Malaviya National Institute of Technology, Jaipur

ID 126 An Investigation on Assessing Process Capability Indices under Weibull distribution

Chun Yi Chang, Chien-Wei Wu, National Tsing Hua University, Hsinchu city, Taiwan

ID 127 Developing a Two-stage Sampling plan for products with an Unilateral Specification Limit

Yuting Won, Chien-Wei Wu, National Tsing Hua University, Hsinchu city, Taiwan

ID 129 Optimal Operation Policies for Vendor Machines with Product Dedicated Variant Towers

Ertan YAKICI National Defence University İstanbul Türkiye Turkey
Haci Sahin, Prof. Dr. Serhan Duran, Industrial Engineering Department Middle East Technical University Ankara, Turkey

ID 136 Integrated optimization problem of Maintenance and Lot-Sizing with Risk assessment

Mohamed Ali Kammoun, Zied Hajej and Nidhal Rezg, Laboratoire de Génie Informatique, de Production et de Maintenance, Metz, France

ID 137 Construction Industries' LCA Adaptability: A Desk Study based SWOT Analysis

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ID 371 Water Resources Dynamics: Chabahr Free-zone Case Study

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ID 372 A mathematical model for cost optimization of Information Facilitated Product Recovery Systems (IFPRS)

Ashish Dwivedi, Jitender Madaan, IIT Delhi, New Delhi, India

ID 373 Combing Text Mining and Survival Analysis for Asset Health Management Using Maintenance Log

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ID 374 Utilization of Color Similarity Index for Evaluating Existing Military Camouflage Designs

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ID 375 Improving Fast-food Restaurant's Method of Operation: Automated Drive through Ordering System

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ID 376 20 years of scientific evolution of cybersecurity: a science mapping

Leonardo Bertolin Furstenau, Michele Kremer Sott, and Andrio Jonas Ouriques Homrich, and Liane Mahlmann Kipper, Universidade de Santa Cruz do Sul – UNISC, Santa Cruz do Sul, Rio Grande do Sul, Brazil
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ID 377 The Use of Industry 4.0 Concepts in the Retailing Process of the Automotive Industry

Nesreen M. Abdelghafar, Mahmoud A. El-Sharief, Mechanical Engineering Department, Assiut University, Egypt.

ID 378 An Empirical Analysis of Financial Ratio Trends of Several Companies Listed in the Philippine Stock Exchange

Manuel Jose V. Mercado, Meagan Allyson Pearl S. Garcia, Joshua B. Ilagan, Renald Redner D. Reveche, and Michael N. Young, Mapua University, Manila, Metro Manila, Philippines

ID 379 A Comparative Assessment of Human Factors and Ergonomics Courses for Industrial Engineering in the Philippines

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ID 380 Occupational Fatality, Injury, Illness, and Work-related Abuses of Indonesian Immigrant Workers in Taiwan 2013–2014

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Muhammad Tariq Shafiq, Ghaleb Al Seena, Mohammed Al Saqqa, Sultan Al Mansouri, UAE University Al Ain, Abu Dhabi, United Arab Emirates

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Sabique Langodan, Ibrahim Hoteit, Physical Sciences and Engineering King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

ID 385 The Effect of Family Ownership on Risk-taking: Socioemotional Wealth Perspective

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ID 386 Development of A Low-Cost Solar Water Purifier Using Metaheuristic Process

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ID 387 Development and Optimization of A Single Stage Multimodal Fixed-Cost Transportation Problem

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Md Mamunur Rashid, Sadman Sakib Tushan, Sourav Kumar Ghosh, Bangladesh University of Textiles, Tejgaon, Dhaka, Bangladesh

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Talal Mouais, Budoor Alwateedhi, Tayeb Brahimi, Imtiaz Ahmad, Effat University, Jeddah, Makkah, Saudi Arabia

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Md. Galib An-Noor Amio, Shibshankar Dey, Faisal Mahmud, Bangladesh University of Engineering and Technology Dhaka, Dhaka, Bangladesh

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Vipulesh Shardeo, Ashish Dwivedi and Jitender Madaan, Indian Institute of Technology Delhi, Hauz Khas, Delhi, India

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Amal Abutaleb, Jory Alsabhani, Sadeem Alkinani, ShahadAlkaydi, Sara Alghamdi, Ahmed Bensenouci, Electrical, and Computer Engineering Department, Effat University, Jeddah, Makkah, Saudi Arabia.

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Loreen Alyana S. Macasu, Marco E. Malabrigo, Esmond Adriel M. Ramos, Rianiña D. Borres, School of Industrial and Engineering Management, Mapua University Manila, Manila, Philippines.

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ID 452 Material Requirement Planning and Inventory Control Application Program of Crispy Retail at PT. Diva Mitra Bogatama with Application Program Based on c# Programming Language

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ID 464 A Multi-Objective Linear Optimization Model for Designing Sustainable Closed-Loop Agricultural Supply Chain

Hossein Reyhani, Younis Jabarzadeh, and Nader Ghaffarinasab, University of Tabriz, Tabriz, East Azarbaijan, Iran
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ID 466 Proposal of a Preliminary Audit Approach for the Modeling and Digitization of a Green Supply Distribution Chain

Cheimaa ABOUESSOUROUR, Khalid BENHIDA, LAPSSII, ESTS, University Cadi Ayyad, Marrakech, Morocco

ID 470 Entrepreneurial Model Based On Business Sector Case Study At Sidoarjo, Indonesia

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ID 477 Voting Behavior on PILKADA Kabupaten Sula 2015

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ID 478 Potential and Barrier Analysis, Implementation of Education Based on Local Wisdom in SDN Burengan 2 Kediri, Indonesia

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C. Asri Budiningsih, and Kastam Syamsi, Universitas Negeri Yogyakarta, Indonesia

ID 480 The Role of the Company's Size to Profitability and Corporate Value Quality

Anasthasia Triwulan Budisaptorini, Grahita Chandrarin, STIEKN Jaya Negara Malang, Indonesia
Prihat Asih, Universitas Merdeka Malang, Indonesia

ID 482 Strategy Model to Build Employee Discipline

Arasy Alimudin, Agus Sukoco, Angga Adi Prebawa, Iswachyu Dhaniarti, Narotama University, Surabaya, Indonesia
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ID 483 Comparative Study of Bio-Asphalt, Coconut Shell Distillation Tar, and Plastic Road in terms of Construction, Economical, and Regulatory Aspects

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Edy Gardjito, Bambang Subiyanto, Fauzie Nursandah, Adisty Riska Hardianti, and Hery Lilik Sudarmanto, Department of Law, Kadiri University, East Java, Indonesia

ID 485 Model of Customer Knowledge Level of Moslem Women and Its Impact on Hijab Purchase Decisions in Surabaya Indonesia

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ID 486 The Effect Of Personal Development And Networking On Entrepreneurship Interest With Supervising Lecturers'as The Intervening Variable

Asmirin Noor, Etn Puspita Sari, Fajar T Novitasari, Fanny Dwi Puspitasari and Pieere Patariato, School of Economic Mahardhika Surabaya East Java Indonesia

ID 487 Evaluation Policy on Quality Assurance Systems at Faculty of Teacher Training and Education Mulawarman University Samarinda

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ID 488 A Strategic Framework for Smart Campus

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ID 489 Simulation-Driven Appointment System Model for a License Processing Office in the Philippines

Jenilyn Shigella G. Yandug, and Christine Anne S. Santos, School of Industrial Engineering and Engineering Management, Mapua University, Manila, Philippines

ID 491 Tropically Adapted Passive Building: The Impact of Building Design and Double Glazing on Ambient Temperature and Windows' Inner Surface Temperature

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ID 494 Multi-Objective Framework of Circular Economy

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Fouad Ben Abdelaziz, NEOMA Business School, Rouen, France

ID 496 Analysis and Improvement of Facility Layout in a Furniture Factory: A Case Application

Mehmet Savsar, Kuwait University, Industrial Engineering Department, Kuwait, and Üsküdar University, Industrial Engineering Department, Istanbul, Turkey
Aminah Aldehaim, Industrial & Management Systems Engineering Department, Kuwait University, Kuwait

ID 500 Technology Mapping: Definitions, Types, and Applications

Alya Abuseem, Yumna Alzaabi, Abeer Alhammadi, Fikri T. Dweiri, and Alaa M. Ubaid, University of Sharjah, Sharjah, United Arab Emirates

ID 501 Design and Interface Development of Business to Consumer (B2C) E-Commerce Websites in the Philippines

Rianina D. Borres, Mary Christy O. Mendoza, Shiela Marie A. Samaniego, Eunise Ina, and M. Panganiban, Mapua University, Manila, Philippines

ID 515 Work Shift Generation In The Operation Of A Bus Rapid Transit System

Daniel Esteban Cortés, and David Álvarez-Martínez, Department of Industrial Engineering, Faculty of Engineering, Universidad de Los Andes, Bogotá, Colombia
Rubén Iván Bolaños, and César Augusto Marín-Moreno, Research, Development & Innovation Department, Integra S.A., Pereira, Colombia

Luis Miguel Escobar, Universidad Libre Seccional Pereira, Pereira, Risaralda, Colombia

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ID 519 Optimization of Flat Rolling Process Through Simulation Approach Using Simufact Forming

Shafaa Al-Maqdi, Jaber Abu Qudeiri and Aiman Ziout, Department of Mechanical Engineering, UAE University, Al Ain, UAE

ID 520 Green Business Approach Based Food Delivery Solution For Home Kitchens In Jaffna Region

Hirishegan Karuneswaran, and Gayashini Ratnayake, Informatics Institute of Technology, Sri Lanka

ID 521 The Effect of Organizational Culture to Employee Performance Through the Work Environment in Harbormastership and Authority of Port Class III Tarakan

Ana Sri Ekaningsih, Karolus Sonu, Theodorus kristianto, Marisi Manalu, Sekolah Tinggi Ilmu Ekonomi Bulungan Tarakan

ID 522 The Effect of Website Quality Using Webqual 4.0 Method on Student's Decision in Registering at University of Kanjuruhan Malang

Christea Frisdiantara, Kawakibul Qamar, Yusriel Ardian, Eko Fachtur Rahman, University of Kanjuruhan, Malang, Indonesia

ID 524 Safety System for Bicycle Rider

Azzah Alshmarani, Huda Shamsaldeen, and Ahmed Bensenouci, Electrical and Computer Engineering Department (ECE), Effat University, Jeddah, KSA

ID 526 Simulation Analysis of Patients Flow in Oncology Clinics

Sara A. Hamad and Khaled S. El-Kilany, Industrial and Management Engineering Department, Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt

ID 530 An optimal preventive maintenance policy for a solar photovoltaic system in order to promote sustainability and profitability

Safouane Elkouiri and Lahcen Mifdal, Lidra, International University of Agadir, Agadir, Morocco

Sofiene Dellagi, Lgipm, University of Lorraine, Metz, France

Anis Chelbi, University of Tunis, National School of Engineering of Tunis, CEREP, Tunis, Tunisia

ID 532 A mathematical model for strategic and tactical planning of the oil & gas upstream supply chain after a merger

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Amin Chaabane, Systems Engineering Department, École de technologie supérieure, Montreal, Canada

ID 534 Study of Text Neck Syndrome Among Smartphone Users Via JACK Software

Amira Khalaf, Bahie Elsamad, Dana Mohammad, Fajer Al-sanad, Khadeja Abdalaziz, Lawrence Al-fandi, Department of Industrial Engineering, American University of the Middle East, Eqaila, Kuwait

ID 536 A fully automatic system for assessing day similarity

Youness CHAWKI, Moulay Ismail University, Faculty of Sciences and Technologies, Boutalamine, Errachidia, Morocco

Khalid EL ASNAOUI, Complex Systems Engineering and Human Systems, Mohammed VI Polytechnic University, Hay Moulay Rachid, Ben Guerir, Morocco

Mohammed OUHDA, Moulay Ismail University, Faculty of Sciences and Technologies, Boutalamine, Errachidia, Morocco

ID 538 Crop Planning Problem using Rectangular Management Zones and Different Irrigation Systems

Omar Salama, Hala A. Farouk, Noha M. Galal, Industrial and Management Engineering Department, Arab Academy for Science, Technology, and Maritime Transport (AASTMT), Alexandria, Egypt

ID 545 Exploring the applications of lean manufacturing practices in textile industry

Muhammad Ali Khan and Hussain Bux Marri, Industrial Engineering & Management, Mehran UET, Jamshoro, Sindh, Pakistan. Awaiz Khatri, Textile Engineering, Mehran UET, Jamshoro, Sindh, Pakistan.

ID 546 Construction Site Layout Planning Kuwait International Airport Expansion- Terminal 2

Dr. Rifat Ozdemir, Marah AlRahhal, Jumannah AlQallaf, Rawan AlAbdullah, Haya AlAradah, Sarah AlMatar, Industrial Engineering Department, American University of the Middle East, Eqaila, Kuwait

ID 558 The Role of Women in the Vegetable Market Traders Alok against Decision-Making Families with Income as a Moderating Variable

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ID 559 The Management Of Professional Zakat In Overcoming The Poverty In Tegalsari District Regency Of Banyuwangi East Java Indonesia

Abdul Kholiq Syafa'at and Lely Ana Ferawati Ekaningsih, Nurul Inayah, Nur Anim Jauhariyah, IAI Darussalam Blokagung
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ID 560 Audit Conformity for Higher Education Using Good University Governance (Gug) Principle

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Pande Gede Angga Priardhi Putra and Raden V.H. Ginardi, Department of Technology Management, Institut Teknologi Sepuluh
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Rita Ambarwati Sukmono, Post Graduate, Universitas Muhammadiyah Sidoarjo, Indonesia

ID 561 Generation of Knowledge Base for Conversation Agent of Nusantara Culinary Tour from Free Text Using Information Retrieval

Dwi Cahyono, Veronika Nugraheni Sri Lestari, Dr. Soetomo University, Surabaya, Indonesia

ID 564 Modular construction innovation in the UK: the case of residential building

Bert Ediale Young and Rafiu Dimeji Seidu, London South Bank University, UK
Menaha Thayaparan, University of Moratuwa, Kadubedda, Moratuwa, Sri Lanka
Joseph Appiah-Kubi, DMC Contracts Ltd., UK

ID 565 Engineering Education towards Industry 4.0

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Vikas Kumar, Bristol Business School, University of the West of England, Bristol, Somerset, United Kingdom

ID 568 Achieving Sustainability through Holistic Maintenance- Key for Competitiveness

Ashutosh Samadhiya, and Rajat Agrawal, Indian Institute of Technology Roorkee, India

ID 570 Barriers and Enablers for Developing Sustainable Supply Chain at Traditional Shipyards in Indonesia

Yugowati Praharsi, Mohammad Abu Jami'in, and Gaguk Suhardjito, Politeknik Perkapalan Negeri Surabaya, Surabaya, Jawa Timur, Indonesia
Hui-Ming Wee, Chung Yuan Christian University, Chung Pei, Taiwan

ID 572 Solar Powered Fish Feeding Machine, Technology For Sme In Sidoarjo, East Java, Indonesia

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ID 573 Portable Air Inflated Freezer Solar cell, Technology For Fisheries SME Sidoarjo Indonesia

Ronny Durrotun Nasihien and Muhammad Ikhsan Setiawan, Agus Sukoco, Department of Management, Narotama University, Indonesia
Abdul Talib Bin Bon, UTHM Parit Raja Johor, Malaysia

ID 575 A model for on-premises systems and cloud ERP integration

Ms. Amizhthini Nakkeeran, Ms. Mahikala Niranga, Dr. Ruwan Wickramarachchi, Department of Industrial Management, University of Kelaniya, Sri Lanka

ID 576 Good Practices for the Green Supply Chain Modelling

Sana Elhidaoui, and K. Benhida, S.Elfezazi, A.Elbouri, Sciences d'ingénieur, Est of Safi, UCA, Morocco

ID 578 Design and Development of Migration Path for Supply Chain Integration for Manufacturing Industries

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Pramod Shahabaddkar and K N Nandurkar, K K Wagh Institute of Engineering Education and Research, Nashik, India

ID 579 Optimization of Supply Chain System in Multi-Product, Multi-Supplier Scenario Using Teaching-Learning-Based Optimization Algorithm

Padmakar Pawar, K. N. Nandurkar, and P. K. Shahabaddkar, K.K.W.I.E.E.R Nashik Select Region India

ID 596 Road Projects Estimation: A Review

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ID 599 Bio char Production from Sugar Cane Bagasse and its Application Sugarcane Processing Wastewater Treatment

Mercy Manyuchi, C. Mbohwa, and E. Muzenda, University of Johannesburg, Johannesburg, South Africa

ID 603 Artificial Neural Networks for Fault Diagnosis of Milk Pasteurization Process – A Comparative Study

Chebira Samia, Bourmada Noureddine, and Boughaba Abdelali, Industrial Safety Department, Hygiene and Industrial Safety Institute, Mustafa Ben Boulaid BATNA 2, University, Batna, Algeria

ID 604 Lean approach in a High Mix, Low Volume Manufacturing Environment – Case study

Anees Hussain, Jose Eduardo Munive-Hernandez, and Felician Campean, University of Bradford Bradford, West Yorkshire, United Kingdom

ID 605 Lean Readiness Level of the Azerbaijan Construction Industry

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ID 606 Value Addition of Woody Biomass (Saw Dust) to Bio Ethanol

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ID 608 An Effectiveness Model of Service Policy of Building Permit (IMB) Based on A Green Spatial Environment in Palembang City

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ID 609 Valorisation of Coffee Waste to Biogas

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ID 612 Environmental Remediation through the Application of the Vermicomposting Technology for Biowaste Management

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ID 617 Comparative Analysis of Cost Overrun on Road Construction Projects Executed by Indigenous and Expatriate Contractors

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ID 618 Design of Job Scheduling Using BAT Algorithm To Minimize Makespan in Hybrid Flowshop

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ID 619 Heating and Cooling Loading Processes and Optimizes Material Properties for the Best Thermal Performances using CES

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ID 626 “Asmeany”: An Android Application For Deaf And Hearing-Impaired People

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ID 627 Evaluation of Pre Versus Post Merger of Banks

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ID 628 Harnessing Fourth Industrial Revolution (4IR) for Improving Poor Universities Infrastructure in Developing Countries–A Review

Thalente Nkosi, Ademilade Aboginije, Nokulunga Mashwama, and Wellington Thwala, University of Johannesburg, Johannesburg, South Africa

ID 629 Stocking decisions in multiple locations periodic review inventory system with order crossover

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ID 630 Comparison of Social Good versus NPA of Indian Banks

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ID 635 Data Mining for Mobile Internet Traffic Flow Forecasting

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ID 636 Change in Community Work Patterns

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ID 638 CSR Communication Strategy of Indian Organizations

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ID 869 Ergonomics Evaluation of Pharmaceutical Services Facilities (Case Study of Pharmacies in Ambon City)

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ID 870 Factors That Influence the Success of Rural Women Empowerment in Salahutu District

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ID 871 Investigation of Factors That Affect the Quality of Village Financial Statements in Buru District

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ID 872 Sustainable Traditional Cultural for Tourism Fisherier with Canvas Business Model on the Ambon Island

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ID 875 Banking Servqual Analysis of Customer Satisfaction (Case Study at Ambon Branch BRI Bank in Ambon City)

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ID 876 Analysis of Horizontal Sumbu Wind Tines Using Three Blades and Diameters of 12 Meter Kinds on Wind Speed in Barat–Maluku Seram Region

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ID 879 An Analysis of Factors Affecting Young Consumers Intention with Online Shopping in Malaysia

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ID 880 Six Sigma Implementation and Analysis – An Empirical Study of a Traditional Boat Building Industry in Indonesia

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ID 881 Influence of Ethical Aspects on the Construction Industry Performance in Egypt

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Model of Customer Knowledge Level of Moslem Women and Its Impact on Hijab Purchase Decisions in Surabaya Indonesia

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Abstract

The purpose of this study is to prevent further misunderstanding regarding hijab for Moslems in Surabaya, understanding the correct knowledge of hijab will affect hijab manufacturers to produce hijab in accordance with Islamic Shari'a. This research is causal conclusive type with quantitative approach, since it aims to test specific relations. Analytical technique used in this research is logistic regression analysis to reveal the strength of prediction on knowledge level towards hijab purchasing decision. The results that the level of customer knowledge in hijab purchase is still at the level of know-how, which is not yet at the know-why level. Customer's buying decision of hijab is based on the quality and color of the fabric, then whether the brand is famous or not. Afterwards, customer generally gains more knowledge regarding hijab and prefer hijab that is complying Islamic Shari'a.

Keywords

Hijab, Moslem Women, Level of Customer Knowledge, Hijab Purchase Decisions.

1 INTRODUCTION

The trending hijab model nowadays for Moslem women is a square hijab, since it is more practical, which unfortunately makes the essence of wearing hijab blurry in terms of customer's comprehension and knowledge. A hijab which complies to the Holy Quran and the Hadith of the prophet is the one that covers the whole body except, face and palms, thick, loose, does not look like men's clothing, does not resemble infidel women's clothing, not for the purpose of beautifying oneself and fame (Al-Albani, 2002).

The use of improper hijab will give a negative impact to the users themselves. Applying hijab requires knowledge because failure to comply to Islamic Shari'a makes the use of hijab to be invalid or simply regarded as wearing a general women's clothing and therefore cannot be considered employing Shari'a attire principle. This is in line with the results of Institute for Assessment of Food, Drugs and Cosmetics of Indonesian Council of Theologian (LP POM MUI) which stated that customer's knowledge regarding what are haram items is very low. Hijab attributes that have been put into customer's consideration are the model, types, and fabric, besides brand, price, and other elements. While customer take these attributes into account, they will utilize their knowledge about hijab, infact in choosing a product, consumers will experience several processes that hierarchically occur step by step, from the cognitive, affection, to the decision-making process and finally conduct purchase action (Feinberg, F. M., et al., 2012). In the cognitive stage, the role of consumer knowledge plays a vital role to influence the processes on the next phase, until the selection of the right product to meet consumer needs. Previous studies showed that product selection is influenced by the level of customer's knowledge (Kolyesnikova, N., et al., 2008; Devi, V. C., et al., 2013; Husaini Usman, 2013; Utami, D., & Suhermi, 2015). Moslem population in East Java on 2016 reached 39,657,788 inhabitants with a percentage of females amounted to 50.6%, thus number of Moslem women in East Java is estimated at 20.082.062 people which is a large market for hijab (BAPPEDA JATIM, 2017). Surabaya as the capital of East Java province becomes the main target for manufacturers of hijab, based on economic census in 2013 that

exhibited an increase on public spending in Surabaya especially for apparels, footwear, and headgear reaching to 105.7%(Tri-Rismaharini, 2017). Similarly, data on Trade Department of Surabaya showed that the number Trading Business License (SIUP) in 2015 is 13.333 Licenses with small Licences dominating the portion(Pemkot Surabaya, 2017). This phenomenon indicates the development of business in Surabaya . Initial survey result towards some buyers of hijab in one of the store located at Darmo Trade Center (DTC), Surabaya, explained that the majority of consumers choose hijab that is cheaper, but with trending model. Thus, consumers are not making Shari'a principle as the most important thing and guidelines in choosing hijab, they may also do not fully understand the requirements of a proper hijab in Islamic rules.

Based on the description above, customer's knowledge of hijab is crucial, since improper use of hijab could lead to an impact on their confidence and failure in understanding the guidance of the Islamic religion, not to mention the fact that more and more manufacturers are offering variety of hijab, however, those orienting to the Shari'a principles are not many. Based on the description above, customer's knowledge of hijab is crucial, since improper use of hijab could lead to an impact on their confidence and failure in understanding the guidance of the Islamic religion, not to mention the fact that more and more manufacturers are offering variety of hijab, however, those orienting to the Shari'a principles are not many. Knowledge will provide information for individuals in every decision making process, selecting the right product, for that reason, it is necessary to conduct an empirical study related to the level of customer knowledge about hijab and its influence on hijab selection to prevent further mistake in understanding hijab to Moslem women consumers in Surabaya. Comprehending the true knowledge of the hijab will indirectly force the manufacturers to produce hijab that is in accordance with Islamic Shari'a. In this study, the research object is customer of hijab store in DTC Surabaya.

Decision-making is the process of determining the choice of alternatives to establish a decision that meets desired goals(Beach, 2005; Jaakkola, 2007; Chikweche, et al., 2012). Decision is a choice between two or more options or alternatives, in which the preference in decision-making depends on how the individual processes the available information. This process is influenced by aspects of the situation and individual characteristics(Ellen Peters et al., 2011). Purchase decision is the process of selecting two or more alternatives that result in a decision to buy or not to buy.

Alternative options should be available when the consumer will take a decision. The process of purchasing decision making, requires the search or receive different information(Schiffman, Leon G. & Kanuk, 2008; Rickwood and White, 2009; Kusá *et al.*, 2014). Consumer purchasing decisions may be influenced by two factors that lie between purchase intention and purchasing decision, that are the attitude of people and unexpected situation. Preferences and buying intention do not always result in an actual purchase(Kotler and Armstrong, 2004). Purchase decisions made by consumers is structured as; Decisions about the type of product; decision about product form; decision on the seller; decision on the number of products; decision about the time of purchase(Zhou, et al., 2005; Mehta, 2007; Sunyoto, 2013; Kumar and Ghodeswar, 2015). Individual behavioural responses do not just happen. Once there is a stimulus from outside, the customer will go through the cognitive, affective, and behavioural processes. Prior to the affective and behavioural components, is the tendency to choose and finally decided to single out a product, next, the customer will pass the cognitive processes, in which there will be awareness (consciousness) of product's existence and knowledge about the product. Consumer knowledge about the product will ultimately affect their preference in choosing a product(Feinberg, et al., 2012).

Knowledge is the result of aknowledge which implemented through a sensory process towards a particular object, especially the eyes and ears which are the objective reality, that is able to be determined systematically or through scientific research by observation and analysis of the subject(Campbell, 2003; Gebert et al., 2003). Moreover, knowledge is something that can be learned through formal learning or one's own efforts, such as reading and observing to understand the circumstances of the specific object(Maier, 2007; McLeod, R., & Schell, 2008; Efendi, F., 2009). Factors that may affect the knowledge are as follows; Level Education; Social Economics; Work; Experience; Age(Ningsih, F. G., 2014). The level of knowledge is grouped into three levels, namely the level of knowledge know-what, know-how and know-why(Koohang, et al., 2008; King, 2009). The level of know-what is the initial level of knowledge in which knowledge is based on an accepted fact, afterwards action is determined when there is a stimulus or a trigger received. The level of know-how is the level which action taken in response to the triggers received has been through the process of analysis and consideration, so as to produce the most appropriate response actions. The level of know-why is highest level, customer has a deep understanding of the causal relationship, interactive effects and other factors that influence the onset of the stimulus or trigger and its relation with the appropriate action to be performed, and produced via a process of interaction with others in a certain social relationships.

2 METHODOLOGY

The This research is conclusive, causal type with quantitative approach because this research aims to test a specific relation, so that in this kind of research it is necessary that the specified information is clearly targeted to obtain evidence related to causation(Rangkuti, 1997).

The population in this study is the consumer of hijab in Darmo Trade Center Surabaya which exact numbers is cannot be certainly mentioned, therefore purposive random sampling is being mobilized in this research. The sample size specified in this study is the minimum sample size, with tolerance of acceptable sampling error rate is 10%, the number of samples is 96 which in this study is rounded to 100 respondents(Joseph F. and Hair, JR., 2004). The instrument used in this study is a questionnaire by spreading or by giving a set of questions or a written statement to the respondent to answer(Sugiyono, 2011). Analytical technique used in this research is logistic regression analysis to explore the strength of prediction of knowledge level to hijab purchasing decision. Logistic regression analysis is mainly used to analyze the qualitative data that reflect two choices between two alternatives, each alternative has different characteristics Kuncoro, 2001). Respondents in this study are divided into four classifications of Moslem women, aged 17 to 25 years as many as 29%, Moslem women aged 26 years up to 34 years as many as 42%, Moslem women aged 35 years to 40 years as many as 18% and Moslem women aged over 40 years by 11%. Seen from the marriage status as much as 43% are married and the unmarried are as much as 57%, from the level of education; under high school 7%, 60% high school and the remaining 33% are in higher education. While regarding respondents work are students as much as 28%, employees 40%, entrepreneurs 10%, and housewives 22%. Length of period of wearing hijab is less than 1 year as much as 13%, 1-2 years as much as 24%, 3-4 years 30% and the remaining 33% wear hijab more than 4 years.

3 RESULT AND DISCUSSION

Table 1 could be described from results of Pearson product moment correlation, known that all items of indicator know-what level (X1), know-how level (X2), know-why level (X3) and Hijab purchasing decision (Y) on the questionnaire have a significant correlation at an error rate of 10% where $r_{count} > r_{table}$ 0.1654, thus it can be said that all the question items in the instruments used in the study is valid.

Table 1: Validity test

Variable	<i>Corrected Item -Total Correlation</i>
X _{1.1}	0.642
X _{1.2}	0.686
X _{1.3}	0.597
X _{1.4}	0.819
X _{1.5}	0.687
X _{2.1}	0.660
X _{2.2}	0.630
X _{2.3}	0.758
X _{2.4}	0.747
X _{2.5}	0.774
X _{3.1}	0.795
X _{3.2}	0.784
X _{3.3}	0.494
X _{3.4}	0.768
X _{3.5}	0.748
X _{3.6}	0.838
Y _{1.1}	0.249
Y _{1.2}	0.746
Y _{1.3}	0.730
Y _{1.4}	0.770
Y _{1.5}	0.462

* Significance level 90%

Table 2: Reliability Test

Variable	Cronbach's Alpha if Item Deleted
know-what level (X ₁)	0.955
know-how level (X ₂)	0.681
know-why level (X ₃)	0.603
Hijab purchasing decision (Y)	0.614

Table 2 explain that the measurement of reliability is using coefficient Cronbach's alpha (α) to indicate how well the item of question positively related to other question with the minimum amount of Alpha is 0.6 , and test results showed that the coefficient Cronbach's alpha (α) of the statement of the variables studied were > 0.6 thus it is concluded that the instruments used are reliable(Priyatno, 2010).

3.1 The level of consumer knowledge of “know-what” towards hijab purchase decision.

The consumer knowledge on the level of 'know-what' depicts hijab customer's knowledge on the obligations of Moslem women to wear hijab along with attributes of a Moslem woman. Based on the survey to 100 Moslem women who purchase hijab at Darmo Trade Center Surabaya, the majority of respondents' knowledge level at the 'know-what' level are as follows; most respondents knowing that hijab is obligatory for Moslem women as much as 95%, knowing that the hijab Moslem women's clothing 90%, knowing that hijab is Moslem women's identity 93% , knowing that hijab glorifies Moslem women 88%, and knows that hijab protects Moslem women as much as 77%. Overall consumer knowledge on know-what level is at 88% The discussion is only focused on indicators of consumer knowledge on know-what level that has an influence on hijab purchasing decisions which consists of:

- The influence of consumer knowledge of know-what level towards the purchase of hijab with trending model, the multivariate logistic regression analysis showed a significant results Indicators X1.1, X1.2, X1.3, X1.4, x1.5> of 0.1 therefore it is not included into the model.
- The influence of consumer knowledge of know-what level towards the purchase of hijab with cheap price, multivariate logistic regression analysis indicated a significant results Indicators X1.1, X1.2, X1.3, X1.4, x1.5> of 0.1 thus it is not incorporated into the model.
- The explained multivariate analysis result that after indicator X1.1, X1.2, X1.4, x1.5 being put out, changes obtained OR $< 10\%$ on the indicator X1.3 (Knowing that the hijab is a Moslem woman's identity) by 1% so that the model is said to be final. Based on the results of multiple logistic regression analysis a conclusion could be drawn, that the overall indicator variable of know-what level of knowledge that is alleged to influence the purchase decision of hijab with good fabric and color, there is one indicator X1.3 (knowing that the hijab is the identity of Moslem women) were influential with p value $0.001 < 0, 1$. The biggest OR value obtained by 1,769 means knowing that hijab is a Moslem woman's identity perceived by the respondents, possess opportunities 31.769 times led to their product purchasing decisions upon hijab with good fabric and color.
- The influence of consumer knowledge of know-what level towards the purchase of hijab with famous brand that knowing that the hijab is a Moslem women's clothing) and knowing that the hijab protects Moslem women) that have a significance value < 0.1 thus incorporated into the model while other variables has a significance of > 0.1 so it is removed from the model Based on the results of multiple logistic regression analysis a conclusion could is clear, that the overall indicator variable of know-what level of knowledge that is alleged to influence the purchase decision of hijab with famous brand, there are two indicators; X1.2 (Knowing that the hijab is a Moslem woman's identity) influential with p value $0,01 < 0,1$. The biggest OR value obtained by 6.794 means knowing that the hijab is a Moslem woman's identity yang felt by the respondents has opportunities 6.794 times led to their product purchasing decisions upon hijab with famous brand. While X1.5 (knowing that hijab protects Moslem women) influential with p value $0,002 < 0,1$. biggest OR value obtained by 26.944 means knowing that hijab protects Moslem women perceived by the respondents, possess opportunities 26.944 times led to their product purchasing decisions upon hijab with famous brand.
- Based on the results of multiple logistic regression analysis , that the overall indicator variable of know-what level of knowledge that is alleged to influence the purchase decision of hijab that complys to Islamic Shari'a, there is one indicator knowing that hijab protects Moslem women influential with p value $0,03 < 0,1$. biggest OR value obtained by 3.037 means knowing that hijab protects Moslem women felt by the respondents possess opportunities by 3.037 timed led to the purchase of hijab which complys the Islamic Shari'a.

3.2 The level of consumer knowledge of “know-how” towards hijab purchase decision.

The influence of consumer knowledge at know-how level towards the purchase decision of hijab with trending model. The only understand the criteria of hijab in accordance with Islamic Shari'a which has a significance value $0.023 < 0.1$ thus incorporated into the model, while other variables has significance > 0.1 thus excluded from the model but result multivariate analysis changes obtained $OR > 10\%$ therefore the model is said to be fit and not being used.

The Influence of consumer knowledge on know- how level towards the purchase of cheap hijab ,multivariate logistic regression analysis showed significant results. Indicators > 0.1 thus it is not incorporated into the model.

The Influence of consumer knowledge on know- how level towards the purchase of hijab with good fabric and color, multivariate logistic regression analysis displayed a significant result > 0.1 thus not incorporated into the model.

The Influence of consumer knowledge on know- how level towards the purchase of hijab with famous brand, just understand how to close the aurat properly which has a significant value $0.00 < 0.1$ and the changes obtained $OR < 10\%$, is the indicator understand how to close aurat properly of 1% so that the model is said to be final. Based on the results of the analysis of multiple logistic regression on Table 16 it is affirmed that the overall variable indicators of knowledge level of know- how that is thought to affect purchasing decisions pf hijab with famous brand, there is one indicator (understand how to close aurat properly) influential with the p value of $0.01 < 0.1$. The biggest OR value obtained by 33.353 means to understand how to close aurat properly perceived by the respondents creates opportunities 33.353 times that led to purchasing decisions of hijab with a famous brand.

The Influence of consumer knowledge on know-how level towards the purchase of hijab which complys to Islamic Shari'a, multivariate logistic regression results points out a significant results Indicators > 0.1 thus it is not incorporated into the model.

3.3 The level of consumer knowledge of “know-why” towards hijab purchase decision.

The Influence of consumer knowledge on know-why level towards the purchase of hijab with Trending Model only indicator I choose hijab with thick fabric and not transparent that has a significant value $0.031 < 0.1$ but value changes obtained $OR > 10\%$ that is the indicators so that the model is said to be fit and not being used.

The Influence of consumer knowledge on know-how level towards the purchase of hijab with cheap price, multivariate logistic regression results points out a significant results Indicators > 0.1 therefore it is not incorporated into the model.

The Influence of consumer knowledge on know-how level towards the purchase of hijab with good fabric and color, multivariate logistic regression results points out a significant results Indicators > 0.1 thus it is not incorporated into the model.

The Influence of consumer knowledge on know-how level towards the purchase of hijab with famous brand, multivariate logistic regression results points out a significant results Indicators > 0.1 consequently it is not incorporated into the model.

The Influence of consumer knowledge on know-how level towards the purchase of hijab with Shari'a guidelines, multivariate logistic regression results points out a significant results Indicators > 0.1 therefore it is not incorporated into the model.

Figure 1 breaks down that the Model of the Levels of Consumer Knowledge Affecting Hijab Purchasing Decision in Surabaya, in fact that the level of consumer knowledge is still on “know-what” level. Indicators that influence hijab purchase decision are whether the material and color is good, knowing that hijab is the identity of moslem women , while the indicator that influence purchasing decisions of hijab with famous brand is to know that the hijab is a moslem women's clothing.

Furthermore, indicators that influence the purchase of hijab in accordance with Shari'a guidelines is to know that hijab protects Moslem women. For “know-how” knowledge level, indicators that impact the purchase of hijab with famous brand is to understand how to close aurat properly. As for the level of “know-why”, no indicators found to influence consumer decision making in choosing hijab. The stage of decision making related to hijab purchase is selecting the good fabric and color, followed by whether the brand is famous or not.

Afterwards, customer generally gains more knowledge regarding hijab and prefer hijab that is complying Islamic Shari'a based on the view that hijab protects Moslem women, understand how to close aurat properly and builds the awareness to wear hijab fabric that is thick and not opaque, only so the customer will prefer hijab in accordance with the guidance of Islamic Shari'a .

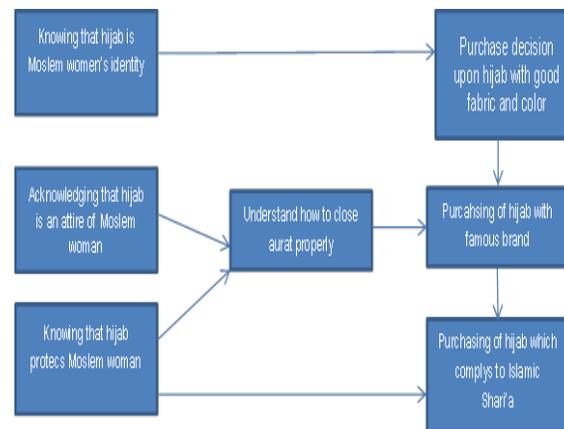


Figure 1: Model of the Levels of Consumer Knowledge Affecting Hijab Purchasing Decision

4 CONCLUSIONS

We Model of consumers knowledge level in the purchase of hijab is still in the “know –what” level and “know-how”, but has not arrived at the level of “know-why”. The stages of hijab purchase decision is selecting a good fabric and color, whether the brand is famous or not, until the time when consumers have an increased knowledge about hijab and understanding to cover the aurat correctly and being aware to wear hijab fabric that is thick and opaque, consumers could then be regarded have been properly following Islamic Shari’a.

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