

May 2023

Proceedings of the International Conference on Industrial Engineering and Operations Management
ISSN / E-ISSN: 2169-8767
ISBN: 979-8-3507-0545-4

4th South American Conference on Industrial Engineering and Operations Management

(Lima, Peru, May 8-11, 2023 – Hybrid)

Editor-in-Chief
Md Nazrul Islam, Ph.D.
and
Tahera Parvin
Assistant Editor

Technical Chairs

Dr. Miguel Avalos Ortecho Edilberto, ULima

Technical Committee (TC) / Review Editorial Board

Prof. Manohar S. Madan, Professor, ITSCM Department, University of Wisconsin-Whitewater,
Whitewater, WI – 53190, USA

Dr. Adnan Hassan, Universiti Teknologi Malaysia

Dr. Cherrafi Anass, ENSAM- Meknes, Moulay Ismail University, Morocco

Taher Azar Ahmad, Benha University, Egypt

Alimohammad AHMADVAND, University of Eyvanekey, Iran

Michel ALDANONDO, Ecole des Mine d'Albi, France

Bandar A. Alkhayyal, Prince Sultan University, Saudi Arabia

Ahmad Taher AZAR, Benha University, Egypt

Armand BABOLI, INSA Lyon, France

Trishit BANDYOPADHYAY, Xavier School of Management, India

Andrés Felipe BARCO, Universidad de San Buenaventura-Cali, Colombia

Samuel BASSETTO, Ecole Polytechnique, Canada

Mahdi BASTAN, University of Eyvanekey, Iran

Philipp BAUMANN, University of Bern, Switzerland

Cedrick BELER, Institut National Polytechnique de Toulouse – Ecole Nationale d'Ingénieurs de Tarbes,
France

Eric BONJOUR, ENSGSI – University of Lorraine, France
Robert BOUTE, KU Leuven, Belgium
Xavier BRUSSET, SKEMA Business School, France
Patricia Alcantara CARDOSO, Universidade Federal do Espírito Santo, Brazil
Kah Hin CHAI, National University of Singapore, Singapore
Aurélie CHARLES, University of Lyon France, France
Elyn Solano CHARRIS, Universidad de La Sabana, Columbia
Anis CHELBI, University of Tunis, Tunisia
Aidin Delgoshaei, Industrial Engineering Department, Kharazmi University, Tehran, Iran
Christine DI MARTINELLI, IESEG School of Management, France
Jose Arturo Garza-Reyes, The University of Derby, UK
Hamed Shakouri GANJAVI, University of Tehran, Iran
Laurent ENESTE, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France
Ali GHARBI, ETS Montreal, Canada
Bernard GRABOT, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France
Elise GRUHIER, University of Bordeaux France, France
Bhaskar GARDAS, Veermata Jijabai Technological Institute, India
Vastag GYULA, Széchenyi István University, Hungary
Marc Haddad, Lebanese American University, Lebanon
Khaled HADJ HAMMOU, Institut National des Sciences Appliquées de Lyon, France
Ramzi HAMMAMI, ESC Rennes School of Business, France
Alaa HASSAN, University of Lorraine, France
Petri HELO, University of Vaasa, Finland
Lazhar HOMRI, Arts et Métiers ParisTech, France
Lars HVAM, Technical University of Denmark, Denmark
Emmanuel HYON, Sorbonne Université – LIP6, France
Peter JACOBSEN, Technical University of Denmark, Denmark
Daouda KAMISSOKO, IMT Mines Albi, France
Özge Karanfil, Koç Üniversitesi, Turkey
Laoucine KERBACHE, HEC Paris, France
Javad KHAMISABADI, Islamic Azad University, Iran
Reza Ramazani KHORSHID-DOUST, Amirkabir University of Technology, Iran
Nathalie KLEMENT, Arts et Métiers ParisTech, France
Anil Kumar, University of Derby, UK
Arun KUMAR, RMIT University, Australia
Vikas KUMAR, University of the West England, UK
Elmar KUTSCH, Cranfield University, UK
Samir LAMOURI, ENSAM Arts et Métiers ParisTech, France
Carman LEE, Hong Kong Polytechnic University, Hong Kong
Danping LIN, Shanghai Maritime University, China
Chrity Yaqiong LV, Wuhan University of Technology, China
Lahcen MIFDAL, Universiapolis Agadir, Morocco
Mehrdad MOHAMMADI, IMT Atlantique, France
Seyed Meysam MOUSAVI, Shahed University, Iran
Simon Peter Nadeem, University of Derby, UK
Balkrishna NARKEDE, National Institute of Industrial Engineering, India

Banu OZKESER, KOLUMAN Industry Automotive, Turkey
Maurice PILLET, Université de Savoie Mont Blanc, France
Rakesh RAUT, National Institute of Industrial Engineering, India
Nidhal REGZ, University of Lorraine, France
Luis Rocha-Lona, Instituto Politecnico Nacional, Mexico
Turki SADOK, University of Lorraine, France
Jérémie SCHUTZ, University of Lorraine, France
Sara SHAFIEE, Technical University of Denmark, Denmark
Shakouri G. Hamed, University of Tehran, Iran
Dellagi SOFIENE, University of Lorraine, France
Reza TAVAKKOLI-MOGHADDAM, University of Tehran, Iran
Ayeley TCHANGANI, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France
Norbert TRAUTMANN, University of Bern, Switzerland
Jiri TUPA, University of West Bohemia, Czech Republic
Yazgi TÛTÛNCÛ, Izmir University of Economics, Turkey
Eric VILLENEUVE, Ecole Supérieure des Technologies Industrielles Avancées, France
Junqiang WANG, Northwestern Polytechnic University, China
Yue WANG, Hang Seng Management College, Hong Kong
Yong WU, Griffith University, Australia
Christoph WUNCK, Jade University of Applied Sciences, Germany
Esma YAHIA, Arts et Métiers ParisTech, France
Bingwen YAN, Cape Peninsula University of Technology, South Africa
Marc ZOLGHADRI, Ecole des Ingénieurs en Mécanique de Paris, France
Funlade Sunmola, University of Hertfordshire, Hatfield, UK
Ali MOSTAFAEIPOUR, Industrial Engineering Department, Yazd University, Iran
Eldon Caldwell, University of Costa Rica
Mohammad Abdullah Shaikh, Deakin University, Australia
Bhaskar Bhandarkar, Indian Institution of Industrial Engineering (IIIE), Mumbai, India
Mohd Khairol Anuar bin Mohd Ariffin, Co-ordinator Master of Manufacturing System Engineering, Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, University Putra Malaysia (UPM), Selangor, Malaysia
Shekar Babu, AMRITA School of Business, AMRITA University, Bangalore, India
Khurshid Khan, Vice Chancellor, Abdul Wali Khan University Mardan (AWKUM), Mardan, Khyber Pakhtunkhwa, Pakistan
Mahdi Bashiri, Professor of Industrial Engineering, Shahed University, Tehran, Iran
MELLAK Abderrahmane, Boumerdes University – Algeria
Sumit Kumar Gupta, Dean of Science, Parishkar college of global Excellence Jaipur, India
Sharif, Indian Institute of Technology (IIT) Kanpur (India)

International Conference of Industrial Engineering and Operations Management (ICIEOM) aims to publish quality research work in the field of industrial engineering and operations management (IEOM) for academics, researchers and practitioners to advance the theory and practice as well as to identify major trends in industrial engineering and operations management. The journal is expected to advance the theory and practice through publishing research-oriented papers with a wide variety of problems related on real-life applications and research which affect in global levels.

ICIEOM covers academic research and industrial issues/applications related on fundamentals of industrial engineering, operations management, business management, operations, design, manufacturing, supply chain management, logistics, systems and service engineering, innovation, entrepreneurship, reliability, quality, lean, six sigma, modeling, simulation, optimization, sustainability, machine learning, and artificial intelligence. The application areas include manufacturing, healthcare, energy, transportation, financial, and business operations. Articles must have scientific research contribution with state-of-the-art review.

Published by IEOM Society International, 21411 Civic Center Dr., Suite # 205, Southfield, Michigan 48076, Phone 1-248-450-5660, Email: info@ieomsociety.org

Open access proceedings are available online at <http://ieomsociety.org/ieom/proceedings/>

Production Director

Md Taufiqul Islam, Ph.D.

Cover Illustration

Takiyah Ali