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QATAR UNIVERSITY

INTERNATIONAL CONFERENCE ON RESILIENCE IN MOBILITY & LOGISTICS

CHALLENGES & OPPORTUNITIES

December, 2023

Doha, Qatar

Conference Proceedings

Organizers



Partners

وزارة المواصلات
Ministry of Transport
دولة قطر - State of Qatar



وزارة البيئة والتغير المناخي
Ministry of Environment and Climate Change
دولة قطر - State of Qatar



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Conference Proceedings

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FOREWORD

College of Engineering, Qatar University

It is a pleasure to welcome all speakers and attendees to the International Conference on Resilience in Mobility and Logistics: Challenges and Opportunities which is held at the College of Engineering, Qatar University. Considering the necessity of comprehensive research and investigation on the resilience and sustainability aspects of mobility and logistics, the College of Engineering recognizes the relevance and timeliness of this international conference.

During the past few years, global logistics and transportation networks have faced numerous challenges and disruptions. From the impacts of the COVID-19 pandemic to mega-events, such as the FIFA World Cup, the need for a resilient transportation system has become extremely important. Moreover, risks related to cybersecurity, natural hazards, regulatory, and compliance in the context of supply chains should also be taken into account. The organization of this conference is a clear example to the country's focus on sustainability and resilience aspects of the transportation system. Furthermore, this is in line with a national vision that accepts the rapid changes in the modern world and ensures that the country is capable of keeping up with global developments.

This conference provides a platform for discussing ideas, experiences, and solutions that will contribute to advancing resilience and sustainability in transportation and logistics systems. I believe that the academics, experts, and practitioners, who will present at this conference, will provide valuable insights that will assist to overcome the challenges associated with the transportation and logistics industries. I would like to extend my sincere thanks to the organizers, sponsors, and all those who have contributed to the success of this conference. Your contributions to organizing a conference on this timely and important topic are highly commendable.

Dr. Khalid Kamal Naji

Dean of College of Engineering



FOREWORD

Qatar Transportation and Traffic Safety Center

I would like to warmly welcome all speakers and attendees to the International Conference on Resilience in Mobility and Logistics: Challenges and Opportunities. This conference aims to discuss and share knowledge on the recent advancements and diverse issues related to mobility and logistics from the resilience perspective.

With the technological innovations and advancements, the world is rapidly moving into a new era. Considering the growing challenges faced by the transportation and logistics sectors, resilience and sustainability aspects should not be ignored. Therefore, I believe that this is a suitable time for a discussion on the resilience of mobility and logistics, particularly considering the country's commitment to promoting sustainable development. The State of Qatar is actively seeking innovative solutions that follow sustainability principles at a time when environmental concerns are critical. The purpose of this international conference is to provide a platform for knowledge sharing, collaboration, promotion of innovation, and transforming ideas into feasible solutions. The panel of speakers from well-known academic and industrial organizations will provide new insights, share best practices, and explore new developments influencing the transportation and logistics industries. This conference is a great venue for researchers and practitioners, who are interested in transportation, mobility, and logistics at academic, professional, or administrative levels. Undoubtedly, this conference will offer a range of opportunities for attendees to explore the latest advancements, policy innovations, technology-related interventions, and practical case studies.

I would like to extend my sincere gratitude to the speakers and organizers who have made this event possible. Your support and commitment to initiating a discussion on the resilience in mobility and logistics in the State of Qatar are highly appreciated.

Dr. Shima Ali Al-Quradaghi

Director of Qatar Transportation and Traffic Safety Center

About the Conference

Overview

Under the patronage of HE Sheikh Mohammed bin Abdulrahman bin Jassim Al Thani, Prime Minister and Minister of Foreign Affairs, and as part of the 3rd International Congress of Engineering and Technology (ICET) organized by the College of Engineering at Qatar University, Qatar Transportation and Traffic Safety Center is hosting the Conference on Resilience in Mobility and Logistics. Industry experts, researchers, policymakers, and practitioners are invited to participate in this conference. The conference aims to facilitate an in-depth discussion by distinguished invited speakers on the best practices currently employed in the field of mobility and logistics. By sharing knowledge and experiences, attendees will have the opportunity to learn from real-world case studies, successful implementations, and lessons learned. This exchange of expertise will contribute to the collective growth and improvement of research and industry, fostering collaboration and exchange of ideas.

Objectives

The primary objective of this conference is to explore and discuss the key challenges and opportunities related to resilience in the fields of mobility and logistics, with the aim of fostering knowledge exchange, collaboration, and innovative solutions among industry experts, researchers, policymakers, and practitioners.

Key Discussions & Topics of Interest

The main topics that will be discussed during the conference are as follows:

- Resilient strategies in transport planning
- Best practices in developing resilient transport
- Challenges in incorporating resilience into mobility and logistics
- Qatar initiatives to enhance resilience in mobility



Conference Committees

Conference Program Chair

Dr. Shima Ali Al-Quradaghi, Director, Qatar Transportation and Traffic Safety Center

Conference Program Cochairs

Dr. Nuri Onat, Qatar Transportation and Traffic Safety Center

Dr. Mohamed Kharbeche, Qatar Transportation and Traffic Safety Center

Conference Program Committee

Dr. Wael Alhajyaseen, Qatar Transportation and Traffic Safety Center

Dr. Charitha Dias, Qatar Transportation and Traffic Safety Center

Eng. Semira Mohammed, Qatar Transportation and Traffic Safety Center

Dr. Deepti Muley, Qatar Transportation and Traffic Safety Center

Dr. Shahram Tahmasseby, Qatar Transportation and Traffic Safety Center

Dr. Qinaat Hussain, Qatar Transportation and Traffic Safety Center

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Agenda



AGENDA

Day 1: 4 December 2023

| Time | Event Description |
|---------------|---|
| 8:00 - 9:00 | Registration and Networking |
| 9:00 - 9:05 | Opening Remarks: Dr. Shima Ali Al-Quradaghi , Director: Qatar Transportation and Traffic Safety Center, Qatar University |
| 9:05 - 9:20 | Keynote Speech: Sheikh Dr. Soud Khalifa Al-Thani , Director: Green Development and Environmental Sustainability Department, MECC |
| 9:20 - 10:30 | <p>Session: Resilience Mobility, Logistics and Climate Change</p> <p>Mr. Hamad Al Marri, Director of Road Transport Licensing, Ministry of Transport</p> <p>Mr. Abdulla Al-Binali, Director Investor Relations & Technical Support Acting Director Marsa Port, Qatar Free Zones Authority</p> <p>Mr. Setrak Khatchikian, Senior Director – Transport, GWC</p> <p>Panel Discussion (Moderator: Dr Nuri Onat)</p> |
| 10:30 - 11:00 | Coffee/Networking Break |
| 11:00 - 12:10 | <p>Session: Resilience in Land Transport</p> <p>Dr. Esmat Zaidan, Associate Professor of Public Policy, Hamad Bin Khalifa University</p> <p>Mr. Faisal Al Nuaimi, Director, Karwa Academy - Mowasalat (Karwa)</p> <p>Dr. Shahram Tahmasseby, Research Associate, Qatar Transportation and Traffic Safety Center, Qatar University</p> <p>Panel Discussion (Moderator: Dr Wael Alhajyaseen)</p> |
| 12:10 - 13:30 | Prayer and Lunch |



AGENDA

Day 2: 5 December 2023

| Time | Event Description |
|---------------|---|
| 9:00 - 9:20 | Registration and Networking |
| 9:20 - 10:30 | <p>Session: Scientific approaches for assessing Resiliency in Mobility</p> <p>Prof. Mohamed Haouari, Professor, Department of Mechanical and Industrial Engineering, Qatar University, Qatar</p> <p>Prof. Abdelaziz Bouras, Professor, Computer Science and Engineering Department, Qatar University</p> <p>Dr. Mohamed Kharbeche, Assistant Research Professor, Qatar Transportation and Traffic Safety Center, Qatar University</p> <p>Panel Discussion (Moderator: Dr. Mohamed Kharbeche)</p> |
| 10:30 - 11:00 | Coffee/Networking Break |
| 11:00 - 12:10 | <p>Session: Sustainable and Resilient Mobility in Qatar</p> <p>Dr. Adel Elomri, Associate Professor, Division of Engineering Management and Decision Sciences, Hamad Bin Khalifa University</p> <p>Dr. Sara Al-Haidous, Commercial Planning & Optimization Superintendent QatarEnergy</p> <p>Dr. Nuri Onat, Associate Professor, Qatar Transportation and Traffic Safety Center, Qatar University</p> <p>Panel Discussion (Moderator: Dr. Shahram Tahmasseby)</p> |
| 12:10- 12:30 | Closing Remark |
| 12:30- 13:30 | Prayer and Lunch |



Keynote Speaker



Sheikh Dr. Soud Khalifa Al-Thani

Director, Green Development and Environmental Sustainability Department, Ministry of Environment and Climate Change

BIOGRAPHY

Dr. Soud Al-Thani is a sustainability professional, academic, and architect with 15 years of experience in sustainability within the built environment, carbon management and climate change. He is also an Adjunct Professor at Hamad Bin Khalifa University (HBKU) in Qatar, where he continues to advance sustainability education and research through industry-academia partnerships. Prior to joining Qatar Foundation in 2019, he held various positions in Qatar focused on environment and sustainability at the Amiri Diwan's Private Engineering Office, and later ASTAD Engineering Consultancy and Project Management Co. During this period of his career, Dr. Soud oversaw sustainable development projects in sectors including housing, education, energy, tourism, and sports. He led multiple public awareness campaigns, conferences, and specialized seminars for leaders, entrepreneurs, and specialized professionals in Qatar, to promote sustainable development and reduce the risk of climate change, as well as heading strategic collaboration programs with local and international organizations. In 2019, he earned a Ph.D. in Sustainable Development from HBKU, and a Bachelor of Arts in Architecture and a Master of Science in Sustainability from Oxford Brookes University in the UK.



Speakers and Abstracts



Mr. Hamad Ali Al Marri

Director, Road transport licenses department,
Ministry of Transport

BIOGRAPHY

Mr. Hamad Ali Al Marri serves as the director of road transport licenses department at the Ministry of Transport. He completed his Bachelor degree in logistics on management of trade and international transport from Arab Academy for Science, Technology and Maritime Transport, Alexandria. Then he pursued his Masters of Business Administration for executive managers from the same university. He is involved in numerous committees, including coordinating committee for resilience in transport and mobility, heavy transport regulatory committee of the Ministry of Transport, road transport and road engineering committee of the cooperation council for the Arab States of the Gulf, technical committee for land, sea and multimodal league of Arab States, and the committee on transport and logistics-ESCWA of the United Nations.



Mr. Abdulla Hamad Al-Binali

Director, Investor Relations & Technical Support,
Acting Director Marsa Port, Qatar Free Zones
Authority

BIOGRAPHY

Mr. Abdulla Hamad Al-Binali, Director of Investor Relations at Qatar Free Zones Authority (QFZ), is a results-driven leader with a mechanical engineering degree from The University of Arizona and an MBA from Qatar University. With over 20 years of global project management experience, Abdulla ensures a seamless experience for investors, focusing on key sectors such as Logistics and Trading, Emerging Tech, and Biomedical Sciences, among others.



Mr. Setrak Katchikian
Senior Director – Transport, GWC

BIOGRAPHY

Mr. Setrak Katchikian joined GWC in 2007 and currently holds the position of Senior Director of Transport at the company. With thirteen years of experience earned before joining the company, he has been highly effective in the meticulous management of the Transport division, achieving high levels of efficiency, revenue, and safety in operations.

International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Achieving Resilience in Logistics Operations - Road Transportation

Setrak Khatchikian

GWC

ABSTRACT

Gulf Warehousing Company QPSC is a public shareholding Company Listed on the Qatar Stock Exchange. GWC has been serving the Qatar market in the road transportation Domain for 20 + Years. The key drivers of success and resilience in operations have been on GWC's operations methodology, quality of manpower, continuous improvement and adoption of technology and a complete commitment to safety.

- The presentation elaborates on the scale of operations that forms the use case for establishing sustainable adaptable operations that GWC has been delivering to the market for more than 20 years, Including in major events like FIFA. IT also elaborates the various major classifications of the nature of major industrial transport like frozen, DG etc.
 - The deck then progresses to indicate the key role selecting the right man power plays and then choosing the right training modules to have fit for purpose personnel
 - We then present the role of compliance , risk mitigation, continuous training and internal process establishment
 - We follow this up with the focus on a complex case scenario of Dangerous Goods and key factors that play a role in establishing a successful operation
 - This is followed up by an outlook on the role technology plays and a view of a robust transport management system
 - Given the context of the Personnel onboarded , training and technology, the presentation then focuses on measuring efficiency and sustaining good industry practices with a focus on Fleet management, fuel and repair management , accident rate reduction, driver performance reviews
-



Dr. Esmat Zaidan

Associate Professor of Public Policy,
Hamad Bin Khalifa University

BIOGRAPHY

Dr. Esmat Zaidan is an Associate Professor in Public Policy at Hamad Bin Khalifa University. Prior to joining HBKU, Dr. Zaidan was an Associate Professor of Planning and Development and the Director of the Honors Program at Qatar University. She also held the position of Assistant Professor of Urban Planning and Sustainability at the UAE University, and a Lecturer in the College of Environment at University of Waterloo, where she completed her master's and PhD degrees. Her professional experience includes her appointments with the World Bank, the Norwegian Agency for Development Cooperation (NORAD), and the UNDP. Her research is interdisciplinary encompassing the fields of engineering, sustainability, and policy. She is currently a Lead Investigator, Lead Project Investigator (cluster grant), and Principal Investigator in projects totaling more than 3.5 million dollars, all funded by QNRF.

Dr. Zaidan has over 60 articles to top-tier ISI/Scopus journals. She employs a diverse range of techniques including Artificial Intelligence (AI), Geographic Information Systems (GIS), spatial statistics, and forecasting models. These methodologies contribute to her advancement in formulating sustainable development policies that are future-oriented and data-driven.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Blockchain-Enhanced Resilience: Navigating Sustainable and
Efficient Mobility Systems

Esmat Zaidan

Hamad Bin Khalifa University, Qatar

ABSTRACT

Striving for sustainable, efficient, and resilient mobility systems, this paper delves into the dynamic interplay of technology, including blockchain, alongside policy frameworks and shifts in societal behavior. It underscores the vital role of integrating various transportation modes, promoting eco-friendly technologies, and nurturing public acceptance of sustainable mobility solutions. Furthermore, the paper emphasizes the imperative of constructing robust systems and infrastructure to ensure uninterrupted mobility, even amidst the formidable challenges posed by climate change and other disruptive forces. In sum, it explores the multifaceted path towards a mobility future that is both environmentally conscious and resilient in the face of uncertainty.



Mr. Faisal Al Nuaimi

Director, Karwa Academy - Mowasalat (Karwa)

BIOGRAPHY

Mr. Faisal Al Nuaimi is the current Director of Karwa Academy – Mowasalat (Karwa) in Qatar. He is a passionate professional in the field of building human potential through training. At Karwa Academy, he fosters awareness of road safety and the necessary policy making by bringing the most outstanding experts in driving and safety to Qatar. He heads accident prevention projects, which aim to identify the causes of accidents on Qatar's roads and develop strategies to prevent them.

He has a remarkable record of accomplishments in road safety and driver training: Under his guidance, Karwa Academy accomplished to train thousands of bus captains and Taxi drivers to ensure the smooth and secure transportation of the Qatar2022 tournament attendees. He also advocates for an inclusive society by facilitating the learning process of autistic drivers in collaboration with Qatar University. The program is tailored to equip autistic drivers with the necessary skills and knowledge to operate a vehicle safely, providing them with greater independence and mobility.

Before Karwa Academy, Mr. Faisal Al Nuaimi held several positions at Qatar Energy. He served as the Head of Counselling under the Vocational Training Division from 2015 until 2021. Where he had a lot of responsibilities such as: supervising the activities of enrollment and registration coordinators, managing the admission and registration of Qatar Energy students at selected colleges in Qatar and ensuring proper advice is given to new trainees by the recruitment staff regarding program criteria and eligibility. Faisal Al Nuaimi holds a master's degree in Strategic Business Unit Management from HEC and a Bachelor of Science degree in Business Administration from Leeds Metropolitan University.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Transportation Resilience

Faisal Al Nuaimi

Karwa Academy - Mowasalat (Karwa)

ABSTRACT

The "Transportation Resilience" presentation emphasizes our commitment to uninterrupted transportation services amidst disruptions. Key aspects include:

1. Bus Service Resiliency: Robust infrastructure with emergency plans and real-time monitoring.
2. Taxi Service Continuity: Advanced tracking for operational efficiency and crisis response.
3. School Transportation Reliability: Enhanced safety measures and backup plans for service interruptions.
4. Corporate Operations Stability: Diversified supply chains and crisis management training.

At Mowasalat Karwa, we integrate technology for route optimization and sustainability, aiming to reduce carbon emissions. Overall, we focus on adapting and maintaining efficient, reliable, and sustainable transportation solutions.



Dr. Shahram Tahmasseby

Research Associate, Qatar Transportation and
Traffic Safety Center, Qatar University

BIOGRAPHY

Dr. Shahram Tahmasseby, P.Eng., stands as a highly seasoned project manager and esteemed faculty member at the Qatar Transportation and Traffic Safety Center (QTTSC). Additionally, he holds an affiliation with the Department of Civil and Environmental Engineering at Qatar University. With a wealth of international experience spanning 23 years in transportation planning, public transit design and operation, and Intelligent Transportation Systems (ITS), Dr. Tahmasseby has contributed his expertise to diverse regions, including Qatar, the EU, Canada, and the UAE.

Currently, Dr. Tahmasseby serves as the Lead Principal Investigator (LPI) for the "Development of a Mobility-as-a-Service (MaaS) Ecosystem within Qatar's Context" project. His commitment lies in pioneering solutions tailored to address the distinctive urban challenges of Qatar.

Over the past 23 years, he has actively participated in various seminars and conferences addressing transportation engineering and economic issues, such as ETC, TRB, ITS World Congress, TAC, CSCE, NACTO, and WCTR. Furthermore, he has established senior-level connections with clients, public organizations, and funding agencies, including the World Bank, UITP, CITE, APEGA, the EBRD, Alberta Transportation, MTO, MOTC, NSERC, MITACS, QNRF and the European Investment Bank (EIB). Since 2006, he has authored or co-authored more than 30 publications in conference proceedings and indexed journals.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Integrated Mobility Solutions – Building a Resilient Urban
Transportation with MaaS, Qatar Case Study

Shahram Tahmasseby

Qatar Transportation and Traffic Safety Center, Qatar University, Qatar

ABSTRACT

The recent surge in investments in public transit infrastructure and operations, witnessed not only in developed nations but also in countries like Qatar, holds transformative potential for personal mobility and the overall structure of transportation systems. This evolution is underscored by disruptive technologies, exemplified by Collaborative Transportation Management, which challenge the conventional boundaries between private and public transport. This paradigm shift, away from ownership models, propels the concept of Mobility as a Service (MaaS).

The COVID-19 pandemic and the hosting of the FIFA World Cup Qatar 2022 have starkly highlighted the necessity for a resilient transport system capable of swiftly adapting to unforeseen disruptions. Consequently, the accelerated deployment of MaaS solutions becomes imperative, offering a dynamic framework to swiftly adjust transportation services in response to evolving societal patterns. This urgency has prompted transport regulators to reconsider the functionalities, business models, and features of their solutions, aiming to mitigate risks and establish business sustainability. As an agile and resilient transport system, Mobility-as-a-Service ensures an uninterrupted flow of people, presenting a viable solution in the face of such challenges.

This study delves into the distinctive features and characteristics of MaaS as a resilient and agile transportation system. Additionally, it explores the implications of MaaS on the travel behavior of the population in Qatar. Notable advantages include the intelligent enhancement of passenger travel patterns, bolstering the resiliency, efficiency, and accessibility of public transit networks—especially for individuals with special needs—and optimizing the utilization and ridership of public transit providers.



Prof. Mohamed Haouari

Department of Mechanical and Industrial
Engineering, College of Engineering, Qatar University

BIOGRAPHY

Dr. Haouari received his PhD in Industrial Engineering from the Ecole Centrale de Paris (CentraleSupélec) in 1991. He is Professor of Industrial and Systems Engineering at Qatar University. He held visiting positions in numerous universities including University of Arizona, Rutgers University, Old Dominion University, Federal University of Rio de Janeiro, University of Paris Dauphine, Bolzano University, and Bilkent University. Dr Haouari taught several courses both at the undergraduate and graduate levels in the industrial engineering and engineering management programs, and supervised 20 PhD dissertations. His research interests include the analysis, modeling and solution of optimization engineering problems with an emphasis on supply chain management, machine and project scheduling, airlines operations, vehicle routing, ship routing and scheduling, and network design. He published more than 120 refereed articles in various academic journals including Transportation Science, INFORMS Journal on Computing, European Journal of Operations Research, Journal of Scheduling, Computers and Operations Research, and Transportation Research Part C/Part E. His h-index is 31. In 2008, Dr Haouari was awarded the IFORS Prize for Operations Research in Development.

International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Infant Formula Milk Supply Chain Resilience

Mohamed Haouari

Department of Mechanical and Industrial Engineering, Qatar University, Qatar

ABSTRACT

Over the past decade, infant formula milk (IFM), serving as the primary nutritional source for infants lacking access to breast milk during their initial two years, has encountered substantial and diverse global supply challenges and disruptions. These disruptions have led to scarcities and substandard products, posing a critical threat to food security and potentially resulting in severe health repercussions, including infant mortality. This study offers a comprehensive framework for establishing a robust IFM supply chain through risk analysis. The framework encompasses a thorough evaluation of the IFM supply chain and its associated risks, pinpointing critical risks and suggesting strategies to bolster the chain's resilience, ultimately fortifying food security. Various methodologies, such as HAZOP risk assessment, K-means++, and K-means clustering, were employed to identify, evaluate, and categorize risks. Consequently, 17 critical risks within the IFM supply chain were identified, each capable of significantly impairing its resilience. These risks have far-reaching consequences, not only impacting infant health but also disrupting the continuity of the supply chain. To address these risks, mitigation strategies were formulated, encompassing traditional approaches alongside 4.0 technology-enabled solutions like Artificial Intelligence, Internet of Things, Big Data Analytics, Cyber-Physical Systems, and Blockchain.



Prof. Abdelaziz Bouras

Professor, Computer Science and Engineering
Department, Qatar University

BIOGRAPHY

Abdelaziz Bouras is Professor at Qatar University (Department of Computer Science and Engineering, College of Engineering) with a secondary appointment as Manager at the Office of Research Support, where he contributes to the achievement of Qatar University research vision, mission and strategic goals. His current research interests focus on Software Engineering, Architectures for Lifecycle Engineering and Information Modeling, including digital preservation, data analytics and blockchains for Enterprise Information Systems and SupplyChains.

He managed numerous international projects related to these fields in EU and in the Middle-East and co-supervised more than thirty PhD studies. Abdelaziz chaired numerous International Program Committees, he is currently on the Scientific Board of several International Journals and is the founder of two International Journals in his domain. Abdelaziz is currently the Chair of the IFIP WG5.1 Working Group on ICT Lifecycle management and is regularly invited to act as an expert for research/education agencies (NSERC/FNRT, ANR/AERES, ANVUR, etc) and for a number of international universities. His accomplishments have been recognized with several international awards. He is a holder of a Honoris Causa PhD degree in Science, and PhD and Habilitation in Computer Science from Université Claude Bernard of Lyon – France, and the ICT Chair position of the MICT Ministry of ICT until Sept. 2016. He was successively deputy Director of PRISMA and DISP “Information and Decision Systems” research laboratories, Director of the “Innovation and Knowledge Transfer Center” for university/industry collaboration at Université Lumière of Lyon, and managed for the European Commission several Erasmus+ programs.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Blockchain-Based Resilient Supply Chains

Abdelaziz Bouras

Computer Science and Engineering Department, Qatar University

ABSTRACT

The gaps and inefficiencies in global supply chains are continuously exposed during critical global situations such as pandemics. There is a growing need for a systematic approach to assess risk, mitigate disruptions and organize critical data in a trusted way. Such risk-based model could be built using blockchains.

As distributed ledger, Blockchain based solutions improve visibility automation and provenance. This talk establishes common ground to provide solutions and best practices in the field, while tackling few challenges faced when integrating blockchain in supply chain ones. It addresses anomaly detection in business processes, and some underlying frameworks that tackles anomalous transactions, enhancing transparency and accuracy of global Supply Chain operations. It also proposes an end-to-end solution for managing business workflows using blockchain smart contracts (created through NLP based extracted information). A proof of concept of a manufacturing supply chain scenario integration between Odoo (supply chain processes) and Hyperledger Fabric (blockchain development platform) will be demonstrated. It shows how the use of smart contracts can improve the multi-level business processes workflow and optimize the processes in terms of security and automation. It also highlights the impact of such solutions on current and future supply chains applications within the Industry 4.0 context where data is an abundant critical resource.



Dr. Mohamed Kharbeche

Assistant Professor, Qatar Transportation and
Traffic Safety Center, Qatar University

BIOGRAPHY

Dr. Mohamed Kharbeche is Research Assistant Professor at Qatar Transportation and Traffic Safety Center, Qatar University, Qatar. He holds a Ph.D. in Operations Research/management science and has an extensive experience in solving complex problems (linear and non-linear) using heuristics, metaheuristics and exact methods. He has vast knowledge in supply chain problems and mathematical modeling software such as CPLEX. He has worked in several areas of optimization and scheduling. He is principal investigator/mentor in many research projects on pedestrian behavioral analysis, traffic system modeling and simulation, and hazardous material transportation and agri-food supply chain funded by Qatar National Research Fund.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Improving Resilience of Agri-Food Supply Chain In Qatar

Mohamed Kharbeche

Qatar Transportation and Traffic Safety Center, Qatar University, Qatar

ABSTRACT

Agri-food supply chains are susceptible to various disruptions, making it crucial to respond and recover swiftly to minimize food waste and financial losses. This study aims to provide an overview of potential long-term and short-term disruptions and their impact on agri-food supply chains. A diverse range of challenges, including transportation issues, rising consumer demand for agri-food products, and flooding, will be presented. Using real-world data from agri-food suppliers and local retailers, selected scenarios are simulated to illustrate their effects on Qatar's food supply chain. The findings reveal that rising food demand and flooding significantly impact supply chain operations and performance, while transportation disruptions do not have a substantial impact. Finally, practical recommendations for enhancing the resilience and sustainability of the agri-food supply chain will be presented.



Dr. Adel Elomri

Associate Professor, Division of Engineering Management and Decision Sciences, Hamad Bin Khalifa University

BIOGRAPHY

Dr. Adel Elomri serves as an Associate Professor in the Division of Engineering Management and Decision Sciences at the College of Science and Engineering, Hamad Bin Khalifa University, Qatar. He earned his Ph.D. and MS degrees in Supply Chain and Operations Management from CentraleSupélec, Paris, France, and a BS degree in Industrial Engineering from the National Engineering School of Tunisia. Dr. Elomri's research interests intersect operations research, operations economics, and engineering management. His work on supply chain carbon footprinting has contributed to introducing novel methods for modeling carbon emissions and examining innovative strategies to reduce the environmental impact of supply chains. Currently, Dr. Elomri is undertaking projects in diverse areas such as healthcare operations management, sustainable supply chain management, and smart logistics.



International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Where has Supply Chain Carbon Footprinting Research Gone?

Adel Elomri

College of Science and Engineering, Hamad Bin Khalifa University, Qatar

ABSTRACT

In recent decades, the concept of carbon footprinting within supply chains has garnered significant attention, playing a pivotal role in addressing environmental regulations and fueling self-initiated designs for low-carbon supply chains. Increasingly, firms find themselves under pressure from both governmental bodies and environmental advocacy groups to decrease their carbon footprints. Regardless of legislative mandates, a rising wave of voluntary industry initiatives aimed at emission reduction is evident. The underlying motivation for such endeavors typically stems from the acknowledgment that high carbon emissions signify inefficiencies within the supply chain. Additionally, certain firms recognize a marketing potential in proffering products with a lower carbon footprint to consumers who are becoming progressively conscious of a low-carbon society. This study conducts a comprehensive analysis of academic literature, scrutinizing the contributions of academic committees towards modeling carbon emissions in supply chains. Particular focus is accorded to the strategies, methodologies, and models proposed for the evaluation and mitigation of carbon emissions within the realm of supply chain and operations management. This research also underscores the role of academic committees in guiding this area of study, specifically highlighting their influence in molding its present state and charting its future course.



Dr. Sara Al-Haidous

Commercial Planning & Optimization
Superintendent, QatarEnergy

BIOGRAPHY

Dr. Eng. Sara Al-Haidous works at QatarEnergy as a Commercial Planning and Optimization Superintendent. She holds a Ph.D. degree in Sustainable Energy from Hamad Bin Khalifa University and an M.Sc degree in Engineering Management from Qatar University. She is currently responsible for planning and scheduling of LNG delivery, refinery products, and Helium and she has been working at QatarEnergy LNG since 2012.

International Conference on Resilience in Mobility and Logistics:
Challenges and Opportunities, Doha, Qatar

Sustainability and Resilience in LNG Supply Chain

Sara Al-Haidous

QatarEnergy

ABSTRACT

Natural gas is an essential fuel in the transition towards a sustainable energy future as it is considered a cleaner source of fuel when compared to other hydrocarbon sources. To enable natural gas delivery from the producer to consumers, natural gas is liquified to enhance transportation efficiency and reliability. As an energy commodity is increasing, whilst being subjected to risks, uncertainties, and disturbances. An analysis of experiences from the global LNG supply chain highlights many of these risks. As such, there is an incumbent need to develop resilient LNG supply chains. In this study, the risks associated with the LNG supply chain are categorized into four dimensions: Political and regulatory, safety and security, environmental effects, and reliability of new technologies. A SWOT method is then implemented to identify strengths, weaknesses, opportunities, and threats in the LNG supply chain, where the LNG supply chain of Qatar is considered as a case study. Relevant strategies are then recommended using a SWOT matrix to maximize strengths and opportunities while avoiding or minimizing weaknesses and threats within the LNG supply chain. Major parameters to be considered to develop a resilient LNG management model are listed based on the level of priority from LNG producer and receiver perspectives. Thus, as part of creating a robust LNG supply chain, decision-makers and stakeholders are urged to use the learnings from the SWOT analysis and experiences from LNG supply chain management. Moreover, this study contributes toward advancing decision support systems within the LNG supply chain to enhance sustainability and resilience. Five scenarios are investigated, which are: vessel types (Conventional, Q-Flex, Q-Max, and mixed fleet), delivery operation modes (single discharge and multi-discharge), and different bunker fuels (HFO, LNG, and dual-fuel). The Mixed Integer Programming model is used to schedule, assign and deliver a fixed number of cargoes for the LNG supply chain within one month considering total transportation costs and emissions. The developed model, which is implemented using the Binary Particle Swarm Optimization algorithm using is subjected to economic and environmental objectives within an overarching strategic aim for sustainability and resilience. The results demonstrate that using LNG as a bunker fuel supports the reduction in the total emissions within LNG transportation leading to enhancing the resilience of LNG delivery operations against growing environmental constraints. Outputs of the study indicate that the multi-discharge LNG-fueled operation mode can achieve a cost reduction of 23.4% and a total emission reduction of 19.7% relative to a single discharge operation mode, where boil-off gas has a minor impact compared to the emissions released from fuel consumption.



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BIOGRAPHY

Dr. Nuri Onat is an Associate Professor at the Qatar Transportation and Traffic Safety Center at Qatar University. He has been actively involved in many international research and industry-funded projects (over 2.5 million USD) encompassing contemporary issues related to sustainability assessment, industrial ecology, and e-mobility. Dr. Onat has over 100 publications (journal plus conference) on various topics: sustainability assessment and analytics, carbon footprint accounting and reporting, system dynamics, and life cycle sustainability assessment. He is also co-director and a founding member of the Sustainable Systems and Solutions Lab (S3Lab). His research works are published in the prestigious interdisciplinary journals of Nature Communications, Renewable and Sustainable Energy Reviews, Transportation Research Part D, Applied Energy, and Industrial Ecology.



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Carbon Emissions Embedded in Global Supply Chain

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ABSTRACT

The scientific community and industries are increasingly recognizing the significance of supply chain-related emissions in the context of global climate change. This growing awareness is propelled by the urgent need to address environmental impacts and adapt to evolving regulatory landscapes. Organizations are under mounting pressure to take responsibility for their indirect global supply chain emissions. This research delves into several case studies drawn from the construction and transportation sectors to illustrate effective methods of accounting for indirect supply chain emissions. By leveraging these case studies, organizations can comprehensively assess their supply chain-related emissions. This not only allows for a more comprehensive carbon footprint but also presents an opportunity to elevate stakeholder engagement. Through robust carbon accounting and reporting practices that encompass their global supply chains, organizations can significantly enhance their sustainability efforts and environmental stewardship.





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