Guest Editorial Preface

Special Issue on Data Analytics in Humanitarian Supply Chain and Disaster Relief Operations Under Risk and Uncertainty

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It is our pleasure to bring forth the Special Issue "Data Analytics in Humanitarian Supply Chain and Disaster Relief Operations under Risk and Uncertainty" for *International Journal of Business Analytics* (IJBAN). Recent years have witnessed a macabre series of natural disasters causing enormous losses to life and property. As a result, humanitarian assistance and disaster relief operations have assumed significance from the standpoint of meeting the immediate needs of communities those are responding to disasters. As rightly pointed by Nathaniel Philbrick, "In all-natural disasters through time, man needs to attach meaning to tragedy, no matter how random and inexplicable the event is."

Disaster management involves a string of actions that can be typically categorized based on the phases of a disaster, including prevention (preventing the onset of a disaster by monitoring disaster possibilities through satellite communication and GIS); mitigation (minimizing the impact of a disaster); preparedness (using early warning systems to prepare the community to counter a disaster); response (use of resources and wherewithal for preservation of life and property of the affected); and recovery (initiatives post-disaster to reinstate stability and bring back normalcy). Data analytics—descriptive analytics, predictive analytics and prescriptive analytics—is known to assist such operations (Tiwari, Wee & Daryanto, 2018). To be precise, real-time analysis of massive datasets generated via mobile phones, sophisticated sensors and social media feeds, provide an opportunity for dealing with intricate societal challenges, especially crisis prevention and disaster management. Correspondingly, as a major initiative towards adoption of Big Data for sustainable development and humanitarian action, Global Pulse is introduced by the Executive Office of the United Nations Secretary-General. At the end of the day, the objective is to build resilience so that vulnerable communities and countries not only recuperate and recover but develop adaptive capacity in the face of natural hazards. Big Data analytics assists governments and other stakeholders to collect, analyze, interpret and visualize information pertaining to natural disasters from weather satellites, as well as gather insights from social media on the preparations and impact of the disasters on communities.

In the context of disaster management, it is important to consider the role of humanitarian organizations, the way they toil assiduously for saving lives by utilizing limited resources, contending for donor money, and working in complicated environments. They typically operate in erratic and

precarious settings; therefore, agility and flexibility of resources and coordination are indispensable. They require information to efficiently perform their tasks and due to massive developments in data analytics, it is crucial that the area of humanitarian supply chain management extracts the benefits extended by the progression of Big Data (Gupta, Altay & Luo, 2017). Humanitarian operations need to be prompt, impactful, uninterrupted and effective (Swaminathan, 2017). Therefore, humanitarian actors employ supply chain strategies particularly related to strategic stocks, postponement and collaboration (Jahre, 2017). Tavana, Abtahi, Di Caprio, Hashemi & Yousefi-Zenouz (2017) offer a multi-echelon humanitarian logistic network which reflects on the location of central warehouses, managing the inventory of perishable products in the pre-disaster period, and steering the relief vehicles in the post-disaster period. Drawing on Big Data analysis, Papadopoulos et al. (2017) maintain how swift trust, public private partnership, and quality information sharing influence supply chain resilience and critical infrastructure resilience, consequently community resilience and resources resilience and hence resilience in a supply chain network. Palen & Hughes (2018) discuss the rapid rise of social media technology and data in a series of disaster experiences, wherein they highlight how social media platforms cross-cut all emergency situations. Humanitarian relief is an up-and-coming phenomenon, where several actors are involved and affected, that further necessitates profound research in the humanitarian aid sector. According to Bhimani and Song (2016), humanitarian aid is failing to keep pace with the increasing numbers of disasters. It is critical to examine the agility and ability of humanitarian supply chains in the immediate response phase post-disaster (Behl & Dutta, 2019), particularly in the wake of advancements in data analytics, which is the primary objective of this special issue.

THE NEED TO EXAMINE THE ROLE OF DATA ANALYTICS IN HUMANITARIAN SUPPLY CHAIN AND DISASTER RELIEF OPERATIONS

Against the aforesaid background, it is realized that research pertaining to humanitarian logistics and humanitarian operations assisted by data analytics is still a promising field with vast opportunities for development. Considering the advancements in data analytics, it is critical to explore the opportunities and challenges it presents in humanitarian relief. The Special Issue, therefore, intends to probe into this much important concern for efficient management of resources and humanitarian relief. The papers selected are rich, moving and enlightening testimonies of the benefits extended by the evolution of Big Data, and nicely continue in the line of research featured by IJBAN.

The first article titled "Hydrodynamic Flood Modelling of Large Regions under Data Poor Situations - a Case Study of Jagatsinghpur District, Odisha" by Mohit Prakash Mohanty and Subhankar Karmakar, focuses on severe constraints of data availability relating to flood prone areas in India and how it confines the potential of carrying out hydrodynamic flood modelling studies. Such difficulties are encountered because of lack of: high-resolution topography, cross-section data of the rivers, and sufficient and accurate calibration and validation data sets. The study then addresses the problems faced in performing a comprehensive 1D-2D coupled flood modelling across a flood prone region Jagatsinghpur, Odisha, India. The constraints faced in terms of hydraulic parameters such as water level, discharge and geometric parameters alike river geometry, are investigated. The simulations have been performed for a severe flood in 2011 that sustained heavy socio-economic losses to the district. The establishment of a modelling platform for flood simulation shall elucidate the major constraints faced in hydrodynamic modelling for flood prone areas with poor data availability.

The second article titled "Some New Alternative Formulations of Adaptive Kalman Filter for Market Risk Beta Estimation" by Atanu Das, explains how Kalman Filter (KF) provides optimal beta estimates with linear models where the noise covariances are known a priori. Noise covariance adaptation based Adaptive KFs (AKFs) have also been used to get the beta estimates. These AKFs suffer from a typical problem namely, inadequate noise filtering. The paper explores new formulation of AKFs to solve such a problem in addition to applying other related existing formulations. The proposed methods have been analyzed through simulation study along with empirical performance verifications

through Value-At-Risk backtesting, expected shortfall analysis and in-sample performance analysis. Results show that two new AKFs and one existing are successful to provide smooth beta estimates.

The third article titled "Digitalization, robotics and genomic research in livestock development" by Lozynska Inna, Lukash Svitlana, Maslak Nataliia and Brychko Alina explores the scientific, innovative and technological trends of livestock development. The study highlighted the restraining factors of the widespread introduction of digitalization and peculiarities impact of genomic research on the development of livestock products. Data was analyzed the evolution of technological stages of introduction the innovative technologies for maximum automation and robotics of all technological processes. This approach provides the farms with the necessary tools and leverage to make the decisions to improve milk quality, manage the herd, increase cow productivity and profitability of production, outlining the overall synergistic effect.

The fourth article titled "The Role of Analytics and Robo-advisory in Investors' Financial Decisions and Risk Management: Review of Literature Post Global Financial Crisis" by Abhinav Pal, Shalini Singh Sharma and Kriti Priya Gupta, discusses how the global financial world has been experiencing increasing complexities in the design and construct of financial instruments, wherein the average retail investors need to be well informed and aware of the risks about the evolution of financial products and financial system. The global financial crisis of 2008-2009 is evidence to the fact that conventional financial advisory methods involving the use of human intermediaries and financial advisors are not infallible to determine one's financial decision or risk management. Almost a decade since the crisis, the advancement of financial technology in the form of Robo-advisors and the use of data and visual analytics have completely transformed the way retail investors make their financial decisions, also in the sphere of risk management of these investors. The study qualitatively analyses the use of Analytics and Robo-advisory in determining retail investors' financial decisions and risk management by undertaking a systematic and an exhaustive literature review on the latest and the previous studies on the subject.

The fifth article titled "A Humanitarian Green Supply Chain Management Considering Minimum Cost and Time" by Dipanjana Sengupta, Amrit Das, Uttam Kumar Bera and Anirban Dutta, examines issues related to natural calamities and green transportation. The paper primarily focuses on humanitarian supply chain management with optimized transportation cost, time and carbon emission. By choosing a real-life problem of flood affected area, the authors demonstrate how, when such disasters happen, quick response can reduce the devastation and save lives. Thus, it requires fulfilling the basic humanitarian needs of the affected population. In such cases, organizations should also maintain vehicular emissions in safe range to mitigate further disaster by pollution. A multi-objective solid transportation problem considering cost, time and emission has been presented in the paper. To solve the problem, the authors have used Goal Programming method and Pareto Optimal solution method, and a comparison of results is shown later.

We hope this Special Issue is an inspiration to our readers.

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