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Operational Improvement Programs and Humanitarian Operations

1. Introduction

The natural and human-made disasters have been increased vulnerability in the global population. Increasing vulnerability calls for quick and effective responses from Humanitarian organisations and other stakeholders such as military, local government, logistics and supply chain practitioners to provide the required relief and development programs to the affected population by coordination of resources including supplies of food, shelter, and medical facilities (Altay & Pal 2014). Comparing with healthcare scenario, where every minute is important to treat a critically ill patient; similar is the case when organisations are dealing with disasters and human suffering caused due to catastrophic events affecting lives of few hundreds to thousands of populations. Additionally, catastrophic events or natural disasters have the potential to significantly disrupt the supply chain operations of organisations and thus impact on their balance sheet (Ambulkar, Blackhurst & Grawe, 2015).

All the aforementioned challenges created by catastrophic events such as COVID19 pandemic requires coordination at the macro level between government, industry, academia, and other humanitarian aid organisations to stabilise the health and economy across the globe. The '*Global Humanitarian Response Plan COVID-19*' was outlined by the United Nations (2020) to facilitate the actioning of a successful response implementation plan for a large-scale COVID19 pandemic. The COVID19 lockdown witnessed an accelerated level of collaboration between stakeholders for enabling the industry to adapt quickly for faster innovation within products, processes, and supply chain mostly through the repurposing of manufacturing or supply chain facilities to produce the much-needed products or deliver services (Ivanov and Dolgui, 2020; Leite et al., 2020). The response from all sectors during the global lockdown have highlighted the importance of operational improvement programs to prepare organisations to be responsive, flexible, resilient, and yet cost-efficient (Leite et al., 2020). However, this special issue is not about COVID19 but focused on other humanitarian crisis from the past and how have organisations responded to minimise disruption using principles of operational improvement programs. Hereon, we discuss limited research in the field of the humanitarian supply chain that focuses on the application of operational improvement programs to stabilise health and economy locally or globally.

2. Research Gap in the field of Operational Improvement and Humanitarian Supply Chain

Despite concerted efforts from the international agencies, the emergency supply chain such as food and medicine has been severely undermined by a lack of coordination and cooperation between stakeholders (Kaynak & Tuğer, 2014). Hence, there is a dire need of finding new methods and solutions for humanitarian disasters and emergencies across the supply and distribution systems. Here, the role played by the humanitarian logistics & supply chain in coordinating the supplies between donors and recipients in a cost-effective, responsive, and dependable way is paramount (Wassenhove, 2006).

Research in humanitarian operations has received increasing attention in the last few years. However, there are two significant gaps can be observed from the current literature. One, majority of the studies focuses on logistics aspects of disaster relief

operations to get the aid to beneficiaries as quickly as possible (Martinez et al., 2011). There is limited evidence of research on understanding of the different processes, and practical application of operational improvement programs in humanitarian operations characterised by high degree of uncertainty. It is important for operations management researchers to focus on operational improvement programmes such as Lean, Six Sigma and Agility that can help humanitarian operation to channel the aids in a more cost-effective, efficient, and responsive way by improving the coordination and communication between different organisations involved in disaster relief operations (Dufour, Émilie, et al, 2018). Such programmes have been traditionally adopted in business operations to support the dominant and long-established organisational objectives of efficiency, quality and responsiveness (Maghsoudi A, Pazirandeh A., 2016). Studies found that 40 per cent of resources are wasted due to duplication of efforts, lack of time to carry out effective analysis and lack of operational improvement in humanitarian operations (Day et al., 2012).

Secondly, literature is deficient on what operation management researchers can learn from working in a highly sensitive and unpredictable, and restrictive humanitarian operations environment (Ertem et al., 2010). The humanitarian operations typically have zero lead time, rely on volunteers and donors, respond to multiple interventions, unknowable outcomes, and the variety, interests and standards of stakeholders (Beamon and Balcik, 2008).

The focus of the SI is to define processes in the humanitarian operations, identify the bottleneck, and offer solutions aiming to smooth the operations in humanitarian disaster and crisis. Further, this special issue includes articles which provide a critical and constructive discussion of the role that operational improvement can play in humanitarian operations. Real-world applications and business models, including company case studies dealing with the application, integration and/or alignment of operational improvement and humanitarian operations from different continents, were shortlisted for publication.

3. Storyline of the Special Issue

After a thorough review and revision process, we present twelve papers selected for their relevance and quality, which span a broad range of key topics linked to the humanitarian supply chain and operational improvement. The first two papers look at general topics related to a humanitarian operation, collaboration and sustainability implications. Firstly, *Tharcisio et al.* identified and analysed the wants and needs of the main stakeholders involved in complex relationships during the disaster response process through a systematic literature review followed by a case study analysis. They reported the following needs between stakeholders when responding to disaster plan: (i) the complex and extensive flow of resources; (ii) the complementary coordination required to provide resources; (iii) the desire to be considered in the response plan; and (iv) the interdependency of the flow of resources and ideas, influences and interests. The second paper from *Mangla et al.* outlined key challenges to Humanitarian Supply and Logistics Management and analysed causal relationships between these challenges for developing sustainability in relief operations in a developing economy of India. The findings identified 'Governance and regulatory'; 'Technology and Facilities' and 'Strategic' challenges were the 'cause' group challenges while 'Financial'; 'Ecological' and 'Social' challenges were identified as 'effect' group challenges. The awareness of these 'cause' and effect' challenges will

bring synergies between humanitarian operations and operational excellence to accomplish sustainability orientation in systems.

Second group of papers from *Rodríguez-Espíndola et al.*, *Singh et al.*, and *Kucukaltan et al.* proposed frameworks on agility, procurement, and business model canvas to respond to disaster relief operations. *Rodríguez-Espíndola et al.* conducted interviews with managers of three European Countries (Belgium, Denmark, Iceland) to look at the adoption of agility in evacuation operations. This article proposes an Agile Evacuation Operations (AEO) evidence-based framework to look at the potential of beneficiary engagement, staff and information, cooperation, and fitness for change to incorporate agile practices at each one of the stages of evacuation planning. The authors suggest that it is important to engage the beneficiaries more closely, empower and train the staff to react to unexpected conditions, and take advantage of local knowledge to enhance operations. *Singh et al.* propose a disaster-resilient procurement framework to ensure the undisrupted supply of raw material and avoid or at least minimise the effect of disruptions caused by natural or human-made disasters. The framework involves resilient supplier selection process as a proactive approach to disaster-resilient supply chain. The last paper in this group from *Kucukaltan et al.* explored humanitarian operations of logistics service providers from a Business Model Canvas (BMC) perspective. The paper provided insights into strategic missions of LSPs in humanitarian relief operations and on the usage of BMC beyond its standard commercial implementations.

In the third group, *Nayak et al.*, *Castañeda et al.*, *Upadhyay et al.*, and *Mishra et al.*, focused on the application of operational improvement methodologies in disaster relief operations. *Nayak et al.* presents a novel integrated lean and agile (leagile) framework which could be employed to efficiently and effectively manage humanitarian logistics and supply chain management in a local jurisdiction of a disaster-hit region in a non-mature economy (Nepal). The paper is informed by guiding principles of UN Sendai Framework for Disaster Risk Reduction to include a leagile framework for achieving both effective and efficient responses to disasters in its priorities for action. Another paper in this group is from *Castañeda et al.*, who adopted an in-depth case study approach to analyse how humanitarian operations processes in Zimbabwe works using quality management tools within a Lean Six Sigma framework and suggested how to improve the response time in procurement, recruitment, and deployment processes in order to provide quick response to those affected by the disaster. *Upadhyay et al.* proposed an integrated framework for pre-disaster (mitigation and preparedness) and post-disaster (response and recovery) phases of humanitarian operations by employing lean and agile principles which can generate rapid response, economies of scale and cost reduction. And the final paper from *Mishra et al.* applies the principles of theory of constraints (TOC) and dynamic capabilities to analyze major earthquake of Nepal in 2015 and draws lessons for improving operational efficiency in humanitarian supply chain (HSC) management.

In the last group, there are three papers linked to the use of technology in improving coordination between stakeholders and improving system response. *He et al.*, proposes an integrated Humanitarian Supply Chain (HSC) Enterprise Resource Planning (ERP) system that utilises the capabilities of the existing Maritime Transport Security Information Systems to improve lean operations of HSCs, and to optimise resources planning and usage during the stochastic assignment of accepting refugees and accommodating them in their journey to safer destinations. The paper introduces the conceptual framework of the integrated ERP system and validates the feasibility

of the framework in the context of the Greek refugee crisis, involving perspectives of stakeholders. *Corsini et al* demonstrated the impact of 3D printing on the humanitarian supply chain. Many of the issues addressed in this paper foreshadow recent interventions to 3D print critical items (such as face masks, face shields and nasal swabs) during the COVID-19 pandemic. It is argued that when life-saving products are needed urgently, and there is a mismatch in traditional supply and demand, 3D printing offers particular advantages. The last paper of this special issue from *Akhtar et al.* showed how effective coordination and collaboration are facilitated by big data and modern information processing systems that are complex and interlocked with contemporary information and communication technology. The study simplifies big data and modern information processing (BDMIP) systems for enabling effective coordination and collaboration between government, local and internal humanitarian organisations. The authors suggested balancing between full-automation, semi-automation and manual processes in the humanitarian supply chain to build effective coordination and collaboration among involved parties.

4. Conclusion

A common theme emerging from the selected twelve papers for this special issue is the importance of collaboration and coordination at the macro level involving government bodies, industry, academia, and organisations from the third sector, to provide a quick and effective response when dealing with Humanitarian crisis such as SARS, EBOLA, TSUNAMI, or the most recent pandemic of COVID19. The selected papers have demonstrated the effectiveness of operational improvement program, call it lean, six sigma, agile, or Industry 4.0 technologies such as 3D printing, IoT, big data analytics, when responding to a humanitarian crisis. The operational improvement programs and framework have capabilities to connect micro-level with meso and macro levels for a coordinated effort in managing the humanitarian supply chain and meeting the needs of the citizens affected by the crisis. Some of the findings reported by the selected twelve papers are applicable in addressing challenges faced by organisations when dealing with global pandemic like COVID19. There are hundreds of examples of successful collaboration between public, private and third sectors to respond to PPE challenges, ventilator challenges, and offer innovative solutions by repurposing their existing processes, products, service offerings, or supply chain (Leite et al., 2020). There are several exemplar cases that could be used for organisational learning and prepare Humanitarian supply chain to deal with future relief operations.

Reference:

- Altay, N., & Pal, R. (2014). Information diffusion among agents: implications for humanitarian operations. *Production and Operations Management*, 23(6), 1015-1027.
- Ambulkar, S., Blackhurst, J., & Grawe, S. (2015). Firm's resilience to supply chain disruptions: Scale development and empirical examination. *Journal of Operations Management*, 33, 111-122.
- Balcik, B., & Beamon, B. M. (2008). Facility location in humanitarian relief. *International Journal of Logistics*, 11(2), 101-121.
- Day, J. M., Melnyk, S. A., Larson, P. D., Davis, E. W., & Whybark, D. C. (2012). Humanitarian and disaster relief supply chains: a matter of life and death. *Journal of Supply Chain Management*, 48(2), 21-36.
- Dufour, É., Laporte, G., Paquette, J., & Rancourt, M. È. (2018). Logistics service network design for humanitarian response in East Africa. *Omega*, 74, 1-14.
- Ertem, M. A., Buyurgan, N., & Rossetti, M. D. (2010). Multiple-buyer procurement auctions framework for humanitarian supply chain management. *International Journal of Physical Distribution & Logistics Management*, 40(3), 202-227.
- Ivanov, D., & Dolgui, A. (2020). Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19

outbreak. *International Journal of Production Research*, 58(10), 2904-2915, DOI: [10.1080/00207543.2020.1750727](https://doi.org/10.1080/00207543.2020.1750727)

Kaynak, R., & Tuğer, A. T. (2014). Coordination and collaboration functions of disaster coordination centers for humanitarian logistics. *Procedia-Social and Behavioral Sciences*, 109, 432-437.

Leite, H., Lindsay, C. and Kumar, M. (2020). COVID-19 outbreak: implications on healthcare operations. *TQM Journal* ([10.1108/TQM-05-2020-0111](https://doi.org/10.1108/TQM-05-2020-0111))

Maghsoudi, A., & Pazirandeh, A. (2016). Visibility, resource sharing and performance in supply chain relationships: insights from humanitarian practitioners. *Supply Chain Management: An International Journal*, 21(1), 125-139.

Martinez, A. J. P., Stapleton, O., & Van Wassenhove, L. N. (2011). Field vehicle fleet management in humanitarian operations: a case-based approach. *Journal of Operations Management*, 29(5), 404-421.

United Nations. (2020). *Global Humanitarian Response Plan COVID-19*. Available at: <https://www.unocha.org/sites/unocha/files/Global-Humanitarian-Response-Plan-COVID-19.pdf> [Accessed: 29 June 2020].

Wassenhove, L. V. (2006), "Humanitarian aid logistics: supply chain management in high gear", *Journal of the Operational Research Society*, vol. 57, pp. 475-489.