A call for a Special Issue

Designing supply chain strategies against epidemic outbreaks such as COVID-19

First identified in Wuhan, China, in December 2019, COVID-19 has since become a pandemic wreaking havoc around the globe. Epidemic outbreaks, such as COVID-19, are a special type of supply chain (SC) risks, which can render many parts of an SC inefficient or inoperable for an uncertain time duration (Govindan et al., 2020). The SC risks from epidemic outbreaks have special features that have scarcely been addressed in the literature as follows:

- The infection characteristics of epidemic outbreaks can potentially affect entire cities at once.
- Their impacts on the SC are very strong and immediate because of the public health challenges, and some SC entities, including manufacturers, suppliers, and distribution centres, and transportation links, become temporarily unavailable.
- Many impacts of epidemic outbreaks, such as delivery delays and material shortages, propagate downstream the SC, especially in global SCs (Ivanov, 2020).

As a consequence, for the SC planning process in the face of epidemic outbreaks, the future decision-making environment is shaped by many types of uncertainty that are most often major. The COVID-19 outbreak has become one of the most serious disruptions that has occurred during the last decades, leading to substantial losses in many global SCs (Araz et al., 2020). In some SCs that produce necessities to cater for social welfare under epidemic outbreaks, economic objectives may have to change to social welfare objectives or economic objectives would need to be optimized subject to some constraints such as the stockpile requirements. Furthermore, traditionally, there exist a number of strategies for an SC, a logistical system or a production system that can be utilized to manage the risks associated with disruptions (Tang, 2006). We can introduce four main research streams in the area of SC planning with consideration of epidemic outbreaks' risks:

1- Detailed design of dispensing strategies immediately after an epidemic outbreak that maintains SC functionality. Papers in this area can provide analyses and practical decision support tools that help policymakers determine (optimize) the operational parameters for the disrupted SCs. Some strategies can be: reshoring strategy in disrupted global SCs to return the production and manufacturing of necessities to the firm's original country, lead time reduction strategies, contingent sourcing, and demand switching.

2- Design of mitigation strategies to reduce the impacts of epidemic outbreaks on SCs. Mitigation strategies are preventive measures taken by SCs in advance of an epidemic outbreak to mitigate their impacts.

3- Healthcare SCs can be designed to support the existing healthcare system to alleviate the suffering of vulnerable people in the event of an epidemic outbreak. Healthcare SCs exist in the

broader ecosystem that includes pharma, medical device, and EMR system manufacturers, hospitals, nursing homes, and other ancillary delivery-settings, physicians, nurses and patients, as well as insurers, methods of payment, nonprofit organizations and federal and state governmental agencies. Topics of healthcare SCs in the face of epidemic outbreaks, especially for COVID-19, are but not limited to:

- SC networks for testing kit distribution
- Recovery networks for the management of medical waste
- Allocation of scarce equipment such as ventilators
- Management of staffing, bed or room capacity
- Sharing of medical resources and infrastructure
- SC networks for resource allocation for epidemic control (see, e.g., Zaric and Brandeau, 2002)
- SC networks for the distribution of essential items for the self-quarantine population

Regarding the planning of SCs under disruption risks, Management Science (MS) and Operations Research (OR) models have been widely applied. Snyder et al. (2016) presented a survey on MS/OR models for SC disruptions. Heckmann et al. (2015) surveyed existing approaches for quantitative SC risk management by setting the focus on the definition of SC risk and related concepts. Studies related to SC network design under disruption events were investigated by Govindan et al. (2017).

4- Finally, as the fourth research stream, we believe that the integration of data analytics approaches and advanced technologies such as Industrial Internet of Things (IoT), cloud manufacturing, cyber physical systems (CPS), and service-oriented technology, with OR/MS models, are suitable tools to assist decision makers in supply chain planning under epidemic outbreaks. Some related topics to this research stream are as follows:

- Applications of information technologies for response operations in the face of epidemic outbreaks.
- Smart logistics based on CPS and/or IoT for humanitarian logistics.
- Real-time recovery decisions in disrupted SCs.
- Addressing the challenges of on-line retailing in the face of demand growth in epidemic outbreaks.
- Prediction of geospatial spread and tracking the paths of disease spread.
- Service selection optimization for SC operations and cloud manufacturing under epidemic outbreaks' risks.
- Simulation-based and data-driven models for supply chain recovery, risk management, and humanitarian operations.
- Big data analytics for operations management and decision sciences in the context of SC planning under epidemic outbreaks.

This Special Issue (SI) is open to researchers throughout the world that are interested in addressing the presented research streams and some related topics.

Manuscript Preparation and Submission

To prepare manuscripts, authors are asked to closely follow the "Author Guidelines" of *Decision Sciences Journal (*https://onlinelibrary.wiley.com/page/journal/15405915/homepage/forauthors.html). Manuscripts will be refereed according to the standards of *Decision Sciences Journal*. During submission, authors should submit their papers via the ***Manuscript Central*** portal (https://mc.manuscriptcentral.com/dsj) no later than 15 December 2020 and designate their paper as a "**Special Issue**" manuscript on Step 1. Also, during step 1 authors are asked to select "**Special Issue**" when queried about an "appropriate department." **Authors should also select Prof. Kannan Govindan as the editor at Step 5**. Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere.

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Publication Schedule

INFORMATION	DEADLINE
Manuscript submission	15 December 2020
First-round decision and feedback	15 March 2021
Revised paper submission	15 July 2021
Final decisions (subject to minor revisions)	15 October 2021

Any questions should be addressed to Prof. Kannan Govindan at <u>kgov@iti.sdu.dk</u>

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