Humanitarian Operations Special Issue in Surveys of OR and MS (SORMS)

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June 29 2017

The first EURO HOpe mini-conference

Outline

i. A summary of future research gaps identified by the published articles in the special issue

ii. Surveys in humanitarian logistics

Special Issue (SI) - Introduction

- ***Surveys in Operations Research & Management Science (SORMS)***
  - "Publishes state-of-the-art literature reviews in analytics, operations research, and management science"
    - *Earlier: Handbooks in Operations Research and Management Science*
    - *2017*: incorporated into *Computers & Operations Research* (COR)
      - Submitting to COR (choose type 'Survey')
      - COR Surveys editor: Prof. Michael Gorman
- ***SI in Humanitarian Operations – Timeline***
  - Call announced: Fall 2015
  - First submissions: May 2016
  - 2 reviews
  - 5 papers published ~ Dec 2016

SI – published papers

- **The funding – Humanitarian supply chain interface** — *51 articles*
  - C. Burkart, M. Besiou, T. Wakolbinger
- **Network restoration and recovery in humanitarian operations: Framework, literature review and research directions** — *100 papers*
  - M. Celik
- **Optimization models for large scale network evacuation planning and management** — *191 papers*
  - V. Bayram
- **A literature review on inventory management in humanitarian supply chains** — *45 papers*
  - B. Balcik, C. Bozkir, E. Kundakcioglu
- **Two-stage stochastic programming in disaster management** — *40 papers*
  - E. Grass, K. Fischer

Summary of Future Research Gaps

The funding – Humanitarian supply chain interface (Burkart et al., 2016)

- Impact of donor characteristics (e.g., institutional vs. private) on operations
- Operational implications of pooled funds
- Transparency and accountability
- Effects of legislations and taxations
- Allocation of scarce funding among programs
- Value of increased flexibility and of reduced variability
- Counter-intuitive donor behavior

- Surveys, empirical/case studies <u>to understand reality better</u>

Summary of Future Research Gaps

- **Network restoration and recovery (Celik, 2016)**
  - Integration of pre-disaster planning and post-disaster repair decisions
  - Modeling uncertainty
    - How does it reveal? Information update mechanisms

- **Network evacuation (Bayram, 2016)**
  - Modeling human behavior in evacuation
  - Evacuation of immobile people (elderly, sick and disabled)
  - Shelter location for safe and timely evacuation
  - Stochastic and robust models

Summary of Future Research Gaps

- **Inventory management (Balcik et al., 2016)**
  - Multi-agency settings & Coordinated planning
  - Coordination with other actors such as suppliers
  - Funding uncertainty
  - Inventory methods/policies for serving displaced people
  - Benchmark data sets, standard problems

- **Two-stage stochastic programming (Grass & Fischer, 2016)**
  - Modeling uncertainty when probability distribution is not available
    - Robust optimization, fuzzy programming
  - Modeling multi-stages/disasters
    - E.g., aftershocks, earthquake/tsunami/nuclear accident
  - Multi-echelon relief chains with different actors

Discussion: Surveys in Humanitarian Operations…

- ***Some observations on surveys in HO:***
  - ***Common classification criteria***
    - Objectives & Performance measures
    - Decisions
    - Uncertain parameters
    - Disaster types
    - Other problem aspects (# of echelons, items, facility types, etc.)
    - Model types and solution approaches
  - ***Large number of surveys on the same/similar topics***
    - Other related surveys not cited
    - A different set of articles in similar surveys
  - Incorrect descriptions of the settings/methods
  - Related work in other disciplines ignored

Discussion:

- Future needs (which topics)?
- Is it possible to establish a common survey framework?
- Can surveys help us to establish a common terminology for the field?
- ???