

Technology innovation and Big Data for humanitarian operations

Technology in humanitarian operations

Information has been recognized as aid for more than a decade now (IFRC, 2005), leading humanitarian organizations to increasingly turn to technology and Big Data. Humanitarian needs can be assessed through social media feeds, text messaging systems and analyses of customer buying patterns. Technology-driven data sources such as global positioning systems, radio frequency-based identification, the use of satellite imagery or drones enable real-time monitoring. Biometric identification technologies are increasingly used for refugee camp management. Relief provision is beginning to shift toward virtual distributions through digital payment systems.

But the bigger the data, the more challenging it becomes to manage, analyze and turn into useful action; information stems from heterogeneous sources and actors and is fraught with uncertainty, the implications of a decision need to be assessed across organizations and actors while time and capacity to make decisions are limited.

To benefit from technology innovation, humanitarian organizations need to adapt their infrastructures, information systems, workflows, decision processes and policies. Three major trends have emerged in this context:

- (1) participatory approaches, emphasizing possibilities of engagement and empowering local communities (Comes, 2016; Gingerich and Cohen, 2015; Palen and Anderson, 2016);
- (2) virtual collaboration in networks of experts and volunteers (Crowley and Chan, 2010; OCHA, 2012) and along with these efforts, an increasing centralized coordination and remote management particularly when access to the affected areas is risky (Donini and Maxwell, 2014; Van de Walle and Comes, 2015); and
- (3) increasing automation and dominance of technology-driven approaches, at least partially owned by private companies with unclear implications for the adherence to humanitarian principles (Sandvik *et al.*, 2014).

Featured articles and a call for research

The articles in this featured issue present original research based on real data collected from humanitarian operations in different contexts. The paper by Noori *et al.* (2016) presents an approach to analyze coordination in new networked settings, reflecting the novel and dynamic structures that arise through collaboration of professionals and volunteers enabled by new communication technology. Vybornova *et al.* (2016) provide a reflection on decision-makers' information in the 2014 West African Ebola outbreak. Given that more and more data are available, they present an approach based on ontologies to organize and make accessible information.

Besides coordination and supporting information sharing across the three realms presented above, there are several open challenges that humanitarian organizations will need to address in the Big Data era: with the shifting focus toward data collection and the introduction of more and more technologies, technology can also become an excuse to not act. Adequate or comprehensive data have increasingly become a requirement for

funding and humanitarian response activities, despite the well-known monitoring and reporting problems in some of the most vulnerable and hard to access areas. In addition, with the increasing hunger for data and technology innovations, concerns about data protection and privacy have become more prominent, and technologies and policies for their use need to address protection concerns. This is particularly true in conflicts, when collecting and sharing data can cause serious harm. Therefore, further interdisciplinary research is needed on the design, development and impact of humanitarian technology in the context of logistics and humanitarian operations.

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References

- Comes, T. (2016), "Designing for networked community resilience", *Procedia Engineering*, Vol. 159, pp. 6-11, available at: <http://dx.doi.org/10.1016/j.proeng.2016.08.057>
- Crowley, J. and Chan, J. (2010), *Disaster Relief 2.0: The Future of Information Sharing in Humanitarian Emergencies*, Digital Humanitarian Network, Washington, DC.
- Donini, A. and Maxwell, D. (2014), "From face-to-face to face-to-screen: remote management, effectiveness and accountability of humanitarian action in insecure environments", *International Review of the Red Cross*, Vol. 95 No. 890, pp. 383-413.
- Gingerich, T. and Cohen, M. (2015), *Turning the Humanitarian System on its Head*, Oxfam, Oxford.
- IFRC (2005), *Data or Dialogue? The Role of Information in Disasters*, World Disasters Report, IFRC, Geneva.
- Noori, N.S. and Weber, C. (2016), "Dynamics of coordination-clusters in long-term rehabilitation", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 6 No. 3, pp. 296-328.
- OCHA (2012), *Humanitarianism in the Network Age*, UN-OCHA, New York, NY, available at: www.unocha.org/hina (accessed October 1, 2016).
- Palen, L. and Anderson, K.M. (2016), "Crisis informatics – new data for extraordinary times", *Science*, Vol. 353 No. 6296, pp. 224-225.
- Sandvik, K.B., Gabrielsen, M., Karlsrud, J. and Kaufmann, M. (2014), "Humanitarian technology: a critical research agenda", *International Review of the Red Cross*, Vol. 96 No. 893, pp. 219-242.
- Van de Walle, B. and Comes, T. (2015), "On the nature of information management in complex and natural disasters", *Procedia Engineering*, Vol. 107, pp. 403-411, doi: 10.1016/j.proeng.2015.06.098.
- Vybornova, O. and Gala, J.-L. (2016), "Decision support in a fieldable laboratory management during an epidemic outbreak of disease", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 6 No. 3, pp. 264-295.