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Humanitarian access and technology: opportunities and applications

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Abstract

Technological advances that have recently emerged or become more widely available offer promising opportunities to support and improve humanitarian access. Yet some technologies may generate new forms of risk, and an over-reliance on technology may foster a widening gap between humanitarians and people in need. In light of these trends, this paper reviews several available technologies and explores the opportunities and challenges of applying them to improve humanitarian access. The paper also highlights areas for further research and encourages practitioners to apply technologies in a manner that is rooted in the core humanitarian principles.

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1. Introduction

The effectiveness of humanitarian action hinges on access: access by humanitarian practitioners to people in need, or by people in need to essential goods and services. New technological advances that have emerged or become more widely available in the past few years offer promising opportunities to support and improve humanitarian access. These can be harnessed to assist humanitarians in, for example, identifying humanitarian needs, getting essential items to those who need them, and enhancing program quality and resource monitoring, all of which can widen the scope of access options, especially in conflict zones.

Yet technology alone cannot solve the problems of humanitarian access. Some technologies may even generate new forms of risk. An over-reliance on technology may foster a widening gap between humanitarians and people in need, which may erode the hands-on understanding and empathy that should be the inspiration and guide of humanitarian action.

To help avoid the pitfalls and risks associated with some technologies, humanitarians can explore technological options as part of an approach to access that is firmly rooted in the core humanitarian principles, committed to sound analysis, creative in generating options, and persistent in working through dilemmas. Such an approach is outlined in Conflict Dynamics' *Humanitarian Access in Situations of Armed Conflict: Practitioner's Manual* [1].

This paper reviews several available technologies and discusses the opportunities and challenges associated with their application in three areas integral to securing and sustaining humanitarian access: (1) access to information; (2) physical access; and (3) enhancing quality and monitoring resource use. The paper also highlights the growing use of drones in humanitarian action and outlines potential benefits and risks for consideration. The paper concludes by discussing the risks posed to principled humanitarian action by an increased reliance on technology in insecure areas and suggests key areas for further research.

2. Access to information

In seeking options and devising strategies to secure and sustain humanitarian access, obtaining current and accurate information is critical for humanitarians, as well as for people in need. Organizations that can obtain and provide the most

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accurate and closest-to-real-time information related to humanitarian needs and assistance will be better positioned to prepare and organize a timely and relevant response, weigh the risks versus the benefits of intervention, and secure the necessary resources. While these technologies can support practitioners in accurately and rapidly obtaining and providing information, the high volume of information available through recent advances in tele-communications also presents challenges in managing and analyzing the information, as well as determining its veracity and reliability.

Worldwide, mobile phone and internet access have grown tremendously in the last decade [2]. Both will soon be nearly ubiquitous, including in conflict-affected humanitarian crises. Smart phones are quickly replacing first generation mobile phones, creating even more potential for information gathering and dialogue between people in need and those who are assisting them. For example, the distribution of mobile phones to drought- and conflict-affected communities in northern Kenya, combined with the establishment of information "hubs" managed by an aid agency, has increased two-way communication between the facilitating aid agency and relief recipients. Community-based relief committees use the phones to communicate information such as environmental conditions to the aid agency, while the information hubs send bulk messages to communities indicating, for example, upcoming food deliveries [3].

In another example, Translators Without Borders helped in the 2014 Ebola response by translating public health and social mobilization messages into local languages. The messages were subsequently distributed via SMS to the mobile phones of community members and health workers in affected countries [4].

In addition to two-way communication between aid providers and aid recipients, it is also now possible to use mobile technology to collect information systematically and remotely using digital data forms on mobile phones. For example, Open Data Kit and Kobo Toolbox are free open-source tools for mobile data collection geared toward humanitarian use [5]. Both tool sets support the creation of customized data forms or surveys for use on mobile phones or tablets, which can be used off-line and uploaded to a server during or following data collection. Aggregated data can then be organized into usable formats and linked to digital maps.

Some technological applications are designed to support qualitative information gathering and analysis. For example, one organization uses a database called SenseMaker to aggregate and analyze thousands of stories told by people in need in East Africa. Local volunteers collect, record, and code the stories using mobile phones and oral recordings. Interviewees identify what they view to be their priority needs and issues before staff upload and analyze the stories to inform their programming [6].

Crowdsourcing – the process of obtaining on-line contributions from a large group of people – can advance humanitarians' efforts to gather, validate, and process information by tapping into the real-time knowledge and information of people in or outside areas of need. For example, crowdsourcing via SMS and Twitter helped humanitarians after the 2010 Haiti earthquake to identify the spread of cholera outbreaks in Port-au-Prince. Crowdsourcing has the potential to dramatically increase the scope and speed of obtaining information in real time in emergencies. While hugely promising, crowdsourcing comes with significant information management and reliability challenges [7]. A study reviewing the role of information and communications technology in disaster response concluded that if humanitarian decision-makers are to effectively take advantage of crowdsourcing, they will "need to figure out how to process information flows from many more thousands of individuals than the current system can handle [8]."

Advances in geomatics – the field of acquiring and processing spatial data – have created new opportunities to use mapping to identify and track humanitarian needs. With the increased precision of Global Positioning Systems (GPS), availability of high quality satellite imagery, user-friendly software, and high-speed internet, humanitarians can now readily produce maps of complex humanitarian situations with much higher precision and quick transmission. Satellite imagery can be particularly effective in tracking population movements in conflict situations, as was done during the rebel attack on N'Djamena, Chad, in 2008, and in northern Sri Lanka following military attacks in 2009 [9].

Ushahidi, a Kenya-based open-source mapping company, pioneered the combination of crowdsourcing and crisis mapping for humanitarian purposes. Humanitarian Tracker has applied the same process to crowdsource and map humanitarian needs in the Syrian conflict since 2011, which can help humanitarians focus their efforts to gain access [10]. One organization has also used crowdsourcing via OpenStreetMap to ask volunteers all over the world to help it create an accurate map of buildings and roads in a town in North Kivu, Democratic Republic of Congo. The map enabled the organization to decide where to lay pipes and dig reservoirs for a water supply project [11].

Crowdsourcing is creating low-cost opportunities related to humanitarian access. However, information from individuals within a crowd may or may not be reliable, and this approach therefore demands triangulation or other forms of information verification.

One further branch of information management – big data – does not have the same limitations as crowdsourcing and may offer some complementary advantages. Rather than relying on specific information from individuals reporting on a certain issue or situation, big data analysis looks at broad trends in the data exhaust – the digital by-product of online use – of whole communities or populations [12]. For example, according to a study in 2012, while crowdsourcing via SMS and Twitter aided the 2010 Haiti cholera response, retrospective analysis of the data exhaust produced by tweets after the earthquake revealed that the cholera outbreaks could have been detected two weeks earlier than they were [13, 14].

Immediately after Typhoon Bopha hit the Philippines at the end of 2012, big data analysis was also used to categorize thousands of social media messages to create a map of the storm's impact within 24 hours of its onset [15]. Big data analysis also revealed roughly how many people left the earthquake-affected area in Nepal in April 2015, and where they went [16], allowing