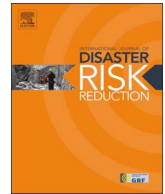




Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

journal homepage: www.elsevier.com/locate/ijdr

The uses of mobile technologies in the aftermath of terrorist attacks among low socioeconomic populations

Hoda Baytiyeh

The American University of Beirut, Faculty of Arts and Sciences, Department of Education, P.O. Box 11-0236, Riad El-Solh, Beirut, Lebanon

ARTICLE INFO

Keywords:

WhatsApp
Mobile technologies
Emergency case
Socioeconomic status
Lebanon

ABSTRACT

Mobile technologies have proved to be effective in the response phase of emergencies. This study investigates the usage of mobile technologies during an authentic emergency involving terrorist attacks in Tripoli, the city with the lowest socioeconomic status in Lebanon. Forty-three participants were interviewed about their use of the WhatsApp mobile application during and after the attacks. The coded data revealed four themes: (1) send and receive requests for help with location and condition, (2) document and share images and videos of the emergency case, (3) reassure family and friends, and (4) express sympathy and emotions. The findings showed that citizens have used mobile technologies to actively coordinate their actions during the emergency. This study thus provides evidence that the use of mobile technologies among community members can assist tremendously in emergency cases especially in the low socioeconomic communities who are in need for easy and affordable tools.

1. Introduction

Researchers believe that people's vulnerability to disasters is evaluated by a combination of existing social conditions with historical circumstances rather than by the incident itself [13,32,79]. It was clearly noticed that the poorest communities are the most affected in the aftermath of crises because they are more likely to suffer from injuries and to face more challenges in the response phase. Therefore, it is believed that socioeconomic status is a significant predictor of the physical and the psychological impacts in times of disasters [19]. Low socioeconomic communities are typically unemployed, uneducated and lack access to needed resources to respond to crises. In fact, dealing with crises requires adequate knowledge for successful communication and coordination during the response phase.

During an emergency, coordination between rescuers, organisations and citizens involved in the incident is crucial for minimising the impact of a disaster. Previous research has discussed disaster communication approaches. For example, Reynolds, Seeger and Palenchar [55] proposed the Crisis and Emergency Risk Communication (CERC) model, which focuses on preventing additional injury and death while creating confidence during the response phase. In addition, Houston [24] presented the Disaster Communication Intervention Framework (DCIF), which focuses on developing coping strategies to improve the community disaster preparedness and resilience.

Because information should be communicated as accurately, effectively and efficiently as possible between all the players at the scene, communication is an essential component for optimising response and

recovery during emergencies. Typically, it is assumed that disaster communication occurs via the mass media channels (radio and TV) through warning messages and news coverage [56]. Rodríguez, Díaz, Santos and Aguirre [56] speculated that disaster news communicated through these mass media channels influences the audience's views, perceptions and responses to disasters. However, the information provided by the mass media channels is created by a single source, usually the government, and the residents, responders and rescuers have little opportunity to contribute to this information. While disasters can damage the communication infrastructure, they can also be the outcome of a communication breakdown [56].

Because reliable and effective communication tools can save lives, researchers have recommended combining mobile communication devices with the Internet to provide high capacity, effective and interactive communication mechanisms to facilitate collaboration during crises [61]. Systems with increased information capacity and interactivity allow respondents and residents to share information, coordinate responses and facilitate assistance [29].

With the evolution of mobile communication technologies, disaster communication can be mediated through two-way communication [20]. Mobile technology devices are platforms and services that offer users the opportunity to share content, connect with other people and engage in conversation. Researchers believe that an ideal emergency communication system should be low-cost, easy-to-use, scalable, mobile and reliable; provide two-way communication; and incorporate geographic information system capacity with visualisation tools [42]. As mobile technologies already possess many of these features and

E-mail address: hb36@aub.edu.lb.

<https://doi.org/10.1016/j.ijdr.2018.02.001>

Received 3 September 2017; Received in revised form 19 January 2018; Accepted 1 February 2018
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characteristics, they are ideal for using in sudden emergency cases that occur in remote locations because they enable residents to document and share information about events in the absence of professional media organisations and reporters [38]. In times of disasters, rescuers and responders need to know details about the emergency so they can prioritise those in greatest need of help. Mobile applications that are available on smart phones, such as GPS to track victims and resources, maps and a translator, are extremely beneficial in disaster response.

Previous researchers showed how mobile technologies enabled users to seek and organize information via applications during and in the aftermath of an emergency. For example, during the attacks on the World Trade Centre and the Pentagon in 2011, it was documented that people were seeking information from the Web [58], and a mobile emergency operations unit was used to maintain control. After the Indian Ocean tsunami in December 2004, the public started to exchange information and photos through their mobile phones, and engage in personal blogging and Flickr as a photo repository [36], and during the 2005 London terrorist attack, citizens on subway trains used their camera phones to provide photos of the bombings to officials, the media and the public. Similarly, on the day after Hurricane Katrina, journalists shared content through their mobile phones and computers [37], and citizens used ICT applications for maps and shelters [49,68].

Researchers believe that mobile applications have several benefits for disaster communications specifically for alerts notifications, locating sensors and hazards maps, and for sending message boards. Also, specific mobile applications can be developed for educational purposes and follow-up to promote disaster awareness and preparedness. However, there are several concerns related to the use mobile networks during disasters because they are not designed to support mass public dissemination. Therefore, a reliable internet infrastructure is needed to secure wireless connection and to use mobile applications [67]. Also, when investigating the use of the warning system process management in the Philippines after 2013 Typhoon Haiyan, it was recommended that in addition to the latest technologies, organisations and individuals need to consider the use of traditional tools for communications such as radio and broadcast vehicles, and not to rely on one single medium of communication [34]. Other researchers suggested a conceptual framework for governments to use social media tools for information retrieval, information filtering and classification, and information extraction. Such strategy may help improving disaster response through the effective use of dynamic data obtained from social media tools [31].

Emergencies located in urban areas often involve a great deal of rapidly changing information and facts, which officials and the news media are sometimes incapable of supporting. Nevertheless, existing research examining the power and usefulness of mobile technologies in authentic cases is limited. Because of the complicated nature of terrorist attacks, communication during the response phase in a low socio-economic community requires flexible systems that can accommodate the unpredictable conditions of the crisis. This study therefore investigates the citizens' use of mobile technologies during the bomb attacks that occurred in Tripoli, Lebanon on Friday, 23rd August 2013; Tripoli being known with its low socioeconomic status.

1.1. Mobile technology tools for communication

Nowadays, mobile technologies, which allow digital communication via short message services (SMS) and instant messaging (IM), have become popular. Church and de-Oliveira [17] investigated the reasons behind the adoption of SMS as a mobile technology in Finland, Norway, the UK, Japan and the US and found that teenagers in these countries primarily used SMS messages for chatting, planning and coordinating, and for carrying out rituals such as exchanging specific messages as gifts with their friends and peers. Several reasons also found for using SMSs include the cost, ease of use, social connection, immediate responses and the simplicity of the language employed, such as abbreviations ([22,35]; A. S. [69]).

The mobile technology tool, WhatsApp Messenger, was launched in 2009 and is available on a variety of smartphone platforms. WhatsApp Messenger is a cross-platform, instant mobile messaging application that enables users to synchronously and asynchronously exchange an unlimited number of text messages, images, videos and audio with their social network, groups and contacts using the same data plan assigned for emails and Web browsing [81]. WhatsApp is also a free application that is easy to download and use, and it enables users to create an unlimited number of groups and chat with up to 256 people at once. The application can be used on a variety of mobile-device platforms and can also be used to make free phone calls [81].

In August 2012, WhatsApp handled 10 billion messages per day, and this figure rose to 27 billion messages per day by June 2013; users also share 700 million photos daily [46]. As of February 1, 2016, 1 billion people, nearly 1 in 7 people worldwide, used WhatsApp [81]. The reasons identified for adopting WhatsApp as a main communication tool over other platforms include its immediacy, cost-effectiveness, the desire to be a part of a trend, and the ability to have constant interaction with friends and family, send an unlimited number of messages and conduct conversations with many friends simultaneously [17].

1.2. The spread of mobile technologies in the Middle East

A recent study involving 6093 face-to-face and telephone interviews with participants aged 18 and older from Egypt, Lebanon, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates (UAE) showed that mobile technologies have pervaded Arab culture [18]. The study found that almost 79% of the participants used mobile technologies at least once a day, and nearly 69% used the Internet daily to learn of the latest news and events from friends and family. In addition, WhatsApp was found to be one of the leading mobile platforms in the Middle East region because it is used by more than 3 out of 4 respondents [18]. WhatsApp is highly popular among all age groups; it has become ubiquitous in the UAE (used by 100% of respondents), Lebanon (97%), Saudi Arabia (94%) and Qatar (89%). In a study conducted in Lebanon, it was shown that WhatsApp mobile technology provides students with the convenience they require for their everyday life through its simplicity, cost-effectiveness and immediacy, as well as a sense of belonging [10]. In fact, the use of WhatsApp can help in bridging a physical distance [14] and motivates students to participate and engage in academic activities [12,53]. In case of emergencies, WhatsApp could serve as a free-cost solution for users to communicate where they can create WhatsApp groups and send notifications of any update or news.

In Lebanon alone, two leading mobile telecommunications companies offer WhatsApp services. The first of these is Touch, which offers the WhatsApp Bundle, providing subscribers with 200 MB to send and receive messages, pictures, videos and audio for \$4 per month [74]. The second company is Alpha, which provides subscribers with 100 MB of WhatsApp services for \$2 per month [3]. However, irrespective of the services offered by companies, anyone who has an Internet connection can use WhatsApp. In 2006, almost 16.7% of the global population could access the Internet, and the Internet penetration rate had almost doubled (34.3%) six years later. In 2016, it was estimated that the Internet was available to 50.1% of the world's population, while the Internet penetration rate was reported to be 75.9% in Lebanon and 57.4% throughout the Middle East [27,28].

2. Methodology

This study uses a multiple case study design with embedded units of analysis (R. E. [64]; R.E. [65,83]) to facilitate the exploration of the phenomenon within and across settings. A variety of data sources are used to ensure that the issue is explored through different lenses for a deep understanding of the essence of the phenomenon.

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