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AN ANALYSIS OF THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN HUMANITARIAN RELIEF

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Abstract

The application of information and communication technologies (ICTs) in all facets of life has made ICTs indispensable to human existence and social development. Thus, this study analyzed the application of ICTs in humanitarian relief. The organisation studied was WaterAid UK, a humanitarian organisation based in the United Kingdom but with global presence. The qualitative research approach was used to gather data. The measuring instrument was the interview which contained 10 items - all open-ended. The findings indicated, among other things, that WaterAid UK used ICTs to promote and secure poor people's right and access to safe water, improved hygiene and sanitation and also support service providers as well as government in developing their capacity to deliver safe water. Similarly, WaterAid was satisfied with the performance of its technologies despite challenges that arose during their application. It was recommended that humanitarian organisations should strive for accurate adaptation of data while engineers should pre-test software to achieve validation purpose.

1. Introduction

Technology is a tool that enhances better control of natural surroundings and human activities. It gives people the insight to create, communicate, assist and probe the nature of the universe in an additional manner, other than their ordinary sense of perception. It does not only build out what existed; it rests on the constant capturing and connecting of natural phenomena and how well they are being structured. Thus, technology could simply mean something coming to being as fresh as the combinations of what already existed, or to produce other things in the same way by using different methods.

According to Oxford Dictionaries 2013, "technology is the application of specific knowledge for practical purposes, especially in industries. It is the use of a machine or device developed from scientific knowledge and also a branch of knowledge dealing with engineering or applied sciences". Technology existed from beginning of man's existence.

Organisations and captains of industries have striven to use technology to have a competitive advantage in the area of developments such as big data, automation, manufacturing software, robotics, digital tools and information technology, among others (Hessman, 2013). Ohlhorst (2012) describes big data as an extremely large data set that has grown beyond the ability to manage and analyse with traditional data processing tool. No wonder technologies have been used to address issues in a wide range of fields. One of such issues is humanitarianism, where Information and communication technologies are being used to do a series of operations in natural or man-made disasters.

Humanitarian services are in the light of broadcast, print and social media as intriguing headlines due to improvement in technologies, advancement in the innovative idea of scientists and the public's quest to know the happenings around their environment.

This does not solely mean that “humanitarianism” started today; it has been in existence since the creation of man and man's willingness to respond to his kind, in times of need (Yvan, 2002). With this in mind, Barnett (2011) recalls the Geneva businessman, Henry Dunant, who, in 1859, joined the local people to offer support to wounded soldiers who were abandoned on the Solferino battlefield. Dunant's single humanitarian action not only launched a citizen's call to alms but it produced the International Committee of the Red Cross and the Geneva Conventions.

During the period that the International Committee of Red Cross (ICRC) came into being, military technologies were used efficiently in killing people in World War I. This gave ICRC the chance to provide medical relief to the victims and urge States to outlaw uncivilized handing of weapons. The duration of the war paved the way for private relief organisations such as Save the Children, Oxfam and Christian Aid to contribute against starvation and for other international humanitarian bodies to be established. During the period of slave trade, humanitarians and abolitionists progressively rescued thousands of Africans from the risks and hazards of the traditional chiefs, Muslim leaders and merchant princes who exported citizens for tributes from subordinate kingdoms.

Humanitarian relief organisations exercised their services to humanity during World War II. This time, governments and non-governmental organisations worked together to extend quality and adequate relief to the survivors around and outside Europe, and served as a global organisation (Barnett, 2011). They moved from the mere willingness to respond to another man's need to development and advocacy, and thus confirmed its universality in the 19th century (Yvan, 2002).

From century to century, the demand for humanitarian relief and support from individuals, organisations and governments has increased significantly because of the unremitting crises which have caused displacement of people, famine, violence and death. Despite all, humanitarian workers have intervened tirelessly throughout the world and saved hundreds of thousands of people daily from human-made and natural disasters. They have also provided temporary emergency relief to endangered populations with such services as: establishing international laws to safeguard human rights, creating awareness on the need for development and unity, peacekeeping and democracy promotion (Barnett and Weiss, 2011).

Ideally speaking, humanitarian organisations are working hard and incorporating the use of highly advanced technologies such as information systems and expert systems to improve and deliver effective services as Sub-saharan Africa and other parts of the world are frequently experiencing a lot of disasters either caused by man or nature. Without humanitarian relief materials to combat famine in conflict zones such as Rwanda, Somali, Nigeria, Sudan and many others, the masses of these nations would have faced miserable future (Omaar & Waal, 1994).

Humanitarian organisations have contributed in the area of educating medical workers and community dwellers on pressing issues common in the environment such as the need to wash hands after using a public place, need to use mosquito treated nets, keep environments

clean at all times, educate on breastfeeding and proper nutrition, need to avoid blood contact with people living with HIV/AIDS amongst others. These goals have made the humanitarians to be actively significant in the society and the world at large (Yvan, 2002). In fact, humanitarian organisations have singled themselves out to aid and act upon poverty alleviation, protection and sustenance of human dignity programmes. Other useful traditional humanitarian responses to crises include: offering emergency food aid, relief coordination/protection service, reconstruction of relief and rehabilitation facilities and disaster prevention and preparedness (Global Humanitarian Assistance, 2013).

This research work was carried out to audit the current information and communication technologies used by a humanitarian organisation, WaterAid, during disaster. It is important to examine and understand how the identified information and communication technologies are applied and the degree of guaranteed satisfaction among users.

It is significant to analyse the various information and communication technologies in operation if rational decisions must be made, data accessed and stored in humanitarian organisations. The findings of this study would add to the existing body of knowledge in the field of ICT, particularly in humanitarian services. They would provide information to humanitarian agencies on the need to employ current technologies in their operations. To a reasonable extent, the findings would indicate the degree of satisfaction in disaster areas in the application of information and communication technologies by WaterAid humanitarian organisation. The research findings would serve as a reference material to researchers in related areas.

2. Background of WaterAid Humanitarian Organisation

WaterAid deals solely with issues of water, sanitation and hygiene in order to help reduce global poverty level. It is one of globally recognised and respected humanitarian agencies. Noted for influencing policies and practices in each region, WaterAid was established in 1981 as a charitable trust (WaterAid, 2013). This non-profit making organisation is involved in bringing clean, safe drinking water to people in developing countries, so as to help end loss of lives and suffering during global crises (WaterAid, 2013). Since its establishment in 1981, WaterAid has provided the much needed water support and raised funds to assist countries, including Ethiopia, Zambia, Sri Lanka, Mozambique, Nigeria, Zambia, Madagascar, Mali, Burkina Faso and Malawi.

WaterAid launched a global strategy of reaching 25 million people across 30 countries in the world in 2015. And as a result, it organised 'the world's largest toilet queue' in 2010 to highlight the crisis and made a call for nations' action by putting pressure on global politicians to pay attention to the need for clean water and safe sanitation for their citizens. The humanitarian organisation has brought amazing global development, as it reached more than 16 million people already in 2011. WaterAid also ensured that more than 134,000 Malawians had an incredible support in benefitting from clean water and safe sanitation

project in 2012. In 2013, the organisation sought to address the shortfall report of some countries by allocating very little aid money to basic system. Thus, the organisation emphasised that aid for water and sanitation should be focused on the right (poorest and marginalised) country with the highest need (Yeo, 2013).

WaterAid is made up of four-member countries: Australia, Sweden, UK and the USA. These four-member countries help to coordinate and fund operations internationally. They bring together experts and experienced individuals to plan activities and make decisions for a focused and fulfilled vision (WaterAid UK, 2013).

3. Disaster and Disaster Types

The media usually cover and treat disaster, even if its occurrence is not widely spread, as a topical issue. The treatment is often for consequential need of public sympathy, political reaction and search for societal responsibility toward the affected areas (Handmers and Dovers, 2013). This has made disaster stories to hit headlines and cause fear and devastation to people around the world, especially the affected geography.

According to Syed (2009), a disaster is the impact of either natural or man-made hazards that significantly affect the inhabitant of a society, community, nation and environment in which it occurs. It could only be said to be a disaster when hazard strikes in vulnerable areas. Syed further adds that disasters can be measured through the number of deaths, the damage recorded and the cost in terms of money lost in a country. An affluent section of the people either survives the occurrence unharmed or is able to recover quickly from it; while others die or are left with disability for the rest of their lives. Syed further emphasises that disaster often causes political and economic upheavals, where a change can be made more instantly than it could have been in a normal circumstance. A disaster could make a political situation complex, especially where concerned parties have to depend upon agreements from other members before a concrete solution can be affirmed. From a different perspective, Parker (1992) suggests disaster to mean an unusual natural and man-made event, including that which is caused by some technological systems which, in a short while, overwhelms the response capacity of human communities, group of individuals or natural environment. This may cause massive destruction, economic loss, injury and loss of lives. Disaster strikes regularly and frequently both in developed and developing countries due to the change in climate in the world. Examples of some world severe disasters which have occurred over the years include the May 2009 Wenchuan earthquake, the September 2005 Hurricane Katrina and the December 2004 Indian Ocean Tsunami (GoodChild and Glennon, 2010). And in Nigeria, a disaster-prone country with millions of people, the country is attacked by common disaster incidents such as floods, landslide, riverbank erosion, oil spillage, heat wave etc.

The World Health Organisation (WHO) in 2003 classified disaster to into the following:

- 1) **Natural (physical) disaster** – This has to do with weather-related disaster (meteorological). Examples include hurricane, cyclone, tornado, typhoon,

cold wave, drought, heat wave, famine, snowstorm, thunderstorm etc. Natural disasters are simply events that occur as a result of natural causes. Though this type of disaster is beyond human to prevent, it could be reduced when early warning signs are in place and lots of people who adhere to instructions could be saved.

- 2) **Man-Made/ Technological disasters:** As the name implies, man-made disasters are simply occurrences from human error. It also incorporates error from technical and operational systems, for example, industrial, nuclear, chemical accidents, fire, wars, civil strife etc.
- 3) **Hybrid disaster:** This is a combination of human error and natural force. Hybrid disaster shares the characteristics of man-made and natural disaster. Some known hybrid disasters are flood-ravaged community built on known flood plain and residential home or companies built in an avalanche area.

4. Stages of Disaster

1. Pre-disaster Stage

Pre-disaster stage, as the name implies, means the disaster-response preparedness stage (Taylor et al, 2012). In some disaster situations, it is expected that humanitarian organisations and government should invest in preparedness, making sure that emphasis is on risk-reduction, development of strategies and programmes that are paramount to vulnerable individuals. Pre-disaster stage incorporates disaster-resilience programmes such as market-based disaster interventions to tackle food and water security, safety-net programmes in Africa as well as flexible financing mechanism to help release funds for humanitarian operations (Save the Children and Oxfam, 2012).

In 2009, Central Texas VOAD presented the various pre-disaster activities of humanitarian relief agencies to include proper planning and organizing of meetings with authorities of affected states, drafting of proposals and programme procedures. Thus, basic documentations are signed, approved and put in place to tackle and reduce the potential risk. This stage, to some disaster managers, is known to be the prevention stage or disaster mitigation stage (Queensland Government, 2013). It is the period where by the public needs to be warned and be made aware of a possible disaster to occur and then developing contingency plans for survival (Jorgustin, 2011).

Some scholars have framed four methods or steps to explain the processes involved in the pre-disaster stage to include: defining and mapping of the system, identifying failure modes, assessing probability of occurrence and assessing severity and effects (Jackson, Sullivan and Willis, 2010). There are explained as follows:

- a) **Defining and Mapping out the System:** This method does not mean to sketch a physical map of the expected event. It simply means the organisations should understand the nature of the expected disaster and then put together the necessary machinery (in the case of response operations) that must be performed and how they link together (Jackson, 2010). For instance, if it were in a report by meteorologist that

a heavy down pour is expected more in a certain community area and which will affect thousands of homes, it is expected that media houses should carry the news and aid workers/volunteers will be on standby to gather people and their properties to a safe location (place that the flood will likely not be affected) while governments and NGOs will source for appropriate measures that could be taken to control severe damages.

- b) Identifying failure modes: When identifying and mapping out strategies on how the severe damages can be controlled, it is useful to observe some factors that may cause the system (relief mechanism put in place) to fail. These failure modes could comprise many factors such as human error, equipment breakdown, staffing problem etc. Despite a well prepared and planned technique to be adopted, some of these failure modes may occur at the middle or towards the end of a successful operation.
- c) Assessing probability of occurrence: Given some of the failure modes, it is essential for government and humanitarian organisations to scale the reliability of the infrastructure and the likelihood that it will or will not happen. For a successful relief, a backup system should be encouraged and practised.
- d) Assessing severity and effect: To add to the couple of numbered failure modes, effect and severity must not be left out. It should be noted that in different places, people and country have a greater role to play on how effective emergency response operators are. Thus, to assess effect and severity, effective response facilities/functions should be in place to increase system performance.

2. Disaster Stage

The disaster stage, also known as the response stage, is divided into two phases. The first is 'prodromal'. It is confirmed that the situation is inescapable and acute - the point of no return when the situation is worst, destroying properties and lives (Destination Recovery Services, 2007). After a series of warnings and preparations have been made in the previous stage (pre-disaster), it is expected that humanitarian aid workers and the people would together combat the risk of disaster. Hence, vulnerable people at this stage rely on the government and aid workers for their safety and assistance for a better life. And in turn, it is the responsibility of these actors to provide long-term rehabilitation measures and reconstruction for the masses.

The disaster stage is usually considered as the second stage after preparedness. This disaster cycle manifests from actions from first responders when a disaster occurs. These first responders take actions as well as assess the depth of the disaster. At this stage, all prepared response mechanism (human and material resources) are coordinated and assigned duties to help fight further damages. This part is mainly focused on victims' immediate needs, especially the need for the protection of life/property, including emergency medical response, food, water and shelter supply. The initial assessment plan is carried out at this stage in order to provide a result that will prompt adequate training, organisation and coordination of long term relief in the next disaster cycle (Rosenberg, 2013).

3. Post-disaster Stage

Post-disaster stage is the aftermath of the disaster (Jorgustin, 2011). Due to the level of damages caused by the disaster, the activities of humanitarian agencies and government may last for a short or prolonged period. This stage requires a lot of brainstorming and interaction to get the affected region back to normal. Arrangements are usually made on how relief such as food, healthcare, shelter, clothing and security would be first dispatched to the people before processing the long term goal of re-stabling and re-building infrastructures (Central Texas VOAD, 2009). According to Rosenberg (2013), there is no specific time when disaster transition occurs, but what the relief officials are concerned about is on how they can clean up and rebuild broken homes and properties. Rosenberg further explains that during this recovery stage, humanitarian organisations and government work in hand to gather necessary information from the previous data cycle; hence, they establish and utilize the lessons learnt to modify and educate the emergency response community. A good example is, when a devastating incident has occurred, relief organisations send volunteers and counsellors to assist by chatting up or debriefing victims of the situation. Some of them may think of all they have lost up to a point that they need medical attention (Cirillo, 2013).

5. Statement of the Problem

Disasters, whether natural or man-made, often leave in their trail enormous cost in terms of human life and property destroyed. Reaching the victims of such disasters may not be easy, owing, most times, to the difficult terrain where the disaster has occurred. Disaster scenes are always chaotic – victims struggle to get out of the scene, relatives and friends search and cry for their loved ones while relief workers struggle to reach the victims with assistance necessary for them to survive. Reaching victims on time could be the difference between survival and death or could help to reduce the cost of reaching the victims with assistance necessary for them to survive.

This fact seems to have pushed humanitarian relief organisations to develop and deploy information communication technologies (ICTs) that could assist in delivering relief to victims of disasters, timely and effectively. What are these ICTs and how are they used to achieve timely relief for the victims? These and more constituted the motivation for this research using Water Aid UK as a case study.

6. Research Questions

The following questions guided the study in auditing the current application of technologies in humanitarian disaster relief:

1. What are the information and communication technologies used by humanitarian agencies to aid relief?
2. What are the reasons for applying these information and communication technologies in humanitarian relief?
3. How are the identified information and communication technologies used in humanitarian services?

- 4 Does the use of information and communication technologies in humanitarian relief give any degree of satisfaction?

7. Theoretical Framework

This paper is founded on the Adaptive Structuration Theory (AST) which is based on Anthony Giddens' (1978) Structuration Theory. The theory places emphasis on groups and organisations' use of technology to accomplish their tasks. It creates perceptions about the role and utility of technology and how it can be applied to the activities of an organization. The adaptive structuration theory offers some insight into the role of advanced information and communication technologies for the attainment of the corporate goals of an organization. According to Desanctis and Poole (1994), "AST is a viable approach for studying the role of advanced information change. AST examines the change process from two vantage points: (1) the types of structures that are provided by the advanced technologies and (2) the structures that actually emerge in human action as people interact with these technologies".

Thus, "the AST could be used to analyze the advent of various innovations such as the printed press, electricity, telegraph, mass transpirations, radio, telephone, TV, the internet etc, and show how the structures of these innovations penetrated the respective societies, influencing them, and how the social structures of those societies in turn influenced and modified innovations original intent" (Desanctis and Poole, 1994).

The theory provides a good model to evaluate the utilization and penetration of new media technologies that are being used in delivering humanitarian relief to disaster victims in different parts of the world.

8. Current Information and Communication Technologies used during Humanitarian Relief

Looking at the many disasters reported daily in the media and the heavy support provided by non-governmental organisations, one can infer that there is need to use the different types of current information and communication technologies and their methods of application to assist humanitarian agencies do their job effectively and efficiently. This section discusses the technologies behind effective delivery of services among humanitarian organisations.

8.1 Internet: Due to the growing quest for access to communication access around the world, Internet technologies have been a source of contact before, during and after a natural disaster. For example, the Kobe earthquake in 1995 that hit a Japanese port was one major disaster in the modern communication age. Official emergency communications were on standby with two computer networks. They set up free online bulletin boards to check incoming online messages that were posted by people. This was assumingly more effective for guidance than official efforts. The advent of the Internet has enhanced humanitarian services because of its wide access. Aside the uploading or writing through emails, the use

of the Internet has helped humanitarian agencies to respond to disaster areas via updates, comments, post etc on social media such as face book, twitter etc (Patrick and Coyle, 2009). Emailing service has also called for humanitarian response worldwide. It has greatly eased the transfer of information from a local humanitarian office to its headquarters.

8.2 Database System: One thing is to crave for an organisation's database and another is to know how to manage it. Information technology communities of humanitarian organisations have come up with solutions for the relief effort to manage the database of organisations, people, projects, inventories and assets as well as collect information through assessments and maps. An example is PARK (profiling and assessment resource kit) database which was developed to serve those in the field of collecting data exercises. It is a valuable field-to-field information sharing stage that is used by organisation managers and experts as well as researchers. A range of users daily upload thousands of working documents into the database and it is organised by the system in a searchable database (PARK Database, 2011).

8.3 Trackers: Trackers come in various ways including Google earth (3D map of users' submission of informative content used to view areas with widespread disaster), Google person finder (software that holds a registry and message of survivors in an attacked location).

8.4 Data Mapping Software: Data mapping software has been used to save hundreds of lives during crises. At such times, the status of these maps changes because of the height of the unfolding disaster and the number of responders adding new content. With the help of aerial and satellites imagery, data mapping software can be operated to locate where victims are, enabling relief volunteers to rescue them. Examples of disaster where this mapping software was used were Haiti earthquake and Japan (where members of the Japanese Street Map Community launched their mapping software and manually mapped thousands of tweets). Crisis maps are simply platforms for humanitarian organisations and for self-help. Since it is not so possible for responders to be everywhere at the same time, it is important that crisis mapping software be used to connect the helpless voices anywhere they are. Other mapping software's used are Ushahidi, Open Street Map, and Google Map Marker (Bauduy, 2010).

8.5 Electronic Payment Systems: The system of paying money or conducting a transaction in the banking hall is getting less stressful by the day because of the introduction of electronic payment system technology. Humanitarian organisations amongst others make proper use of this branchless banking service opportunity to reduce diversion of funds, thus making humanitarian finances done with a debit card, smart card, mobile money or electronic voucher systems. Government and agencies responsible for financing humanitarian services can now transfer money using e-payment method rather than carry bags of money to an office or camp grounds.

8.6 Mobile Banking System: Financial transactions are made easy and possible by money on mobile device software. Today, donors can sit in the comfort of their homes and in their cars to donate to relief disaster – affected individuals. This has promised to be a long-term economic benefit as well as humanitarian emergency relief since the number of mobile users is on the high rate. In addition, it does not demands users with sophisticated phones because it involves text messaging. For example, in UK where mobile operators (02, Virgin Mobile, T-mobile etc) provided a free text number to accept donations by to disaster emergency committee, it recorded a massive success. Also, fund raising has established an good advantages in the use of sms as a means of reaching out to disaster-affected individuals by voluntary organisations. An example was recorded in the earthquake that struck in Italy in 2009: three mobile operators raised an donation of 18 million Euros to victims (Patrick and Coyle, 2009).

8.7 Tele-health and Tele-care Technology: According to NHS Lothian report, telehealth and telecare technology has helped patients to monitor their own health situations and report same to care givers right from their own bedrooms. This technology gives 24-hour confidence and support to the patients because they can provide their GP with their body feeling through completing a questionnaire provided on the machine. This questionnaire is accessed by either a nurse or a doctor who then takes up the reading and acts upon it (Royal College of Nursing, 2013). While tele-health tool helps the user to gather data from an ehealth source on his body temperature, blood pressure, weight and pulse, tele-care simply combines equipment such as alarm, sensors etc to aid the user to be responsive to his health system. For example, in the USA, diabetic patients are supplied with daily on-screen questions to answer using a message device. Care givers and coordinators monitor the answers daily in order to determine if intervention is necessary.

8.8 Language Technology: When humanitarian organisations are set to move to a place where aid is needed, one of the many factors they consider about the area is what language is commonly spoken as a major means of communication. If participating personnel are not fluent or they do not know how to use the language of that area, then there is need for a speech translator or language technology to be in operation. Where relief personnel are educated in the native language of current interest for fluency, information and communication technologies are also produced to solve the minority-language communication challenge. Humanitarian agencies lately use a new machine translator in significant domains such as medicine.

8.9 Mobile Technology: From cell phones to newly introduced smart phones, humanitarian organisations, governments, volunteers, international institutions and the victims have been drawn closer to one another in times of disaster. This communication flow has been very effective in the affected areas because responses are immediate through a call away or via. Mobile technology has gone far to assist in crowd sourcing and crisis mapping (Goldberg, 2011).

8.10 Information Forensics: Forensic science has really been explored in the field of criminology (crime investigation) but due to the advancement in the use of information and communication technologies to do some work, humanitarian agencies are employing forensic tools in their relief operations (Brown & Gould, 2005). The roles of forensic anthropologists have increased since after the September 11, 2001 incident in the USA. Humanitarian agencies explore these ways as means of identifying victims during disaster, for investigation and recoveries.

8.11 Digital Satellites: The application of satellites in humanitarian mission has helped to prevent a return of full scale wars between countries. This is made possible when governments and international institutions such as the UN have the aspiration to survey vulnerable population. Since their discovery, digital satellites have been employed by individuals and government bodies to persistently and remotely survey the environment to unveil the risk disaster-prone populations face, and also control the risk of gross human rights abuses. In addition to this, digital satellites have been used by many humanitarian organisations to inform policy makers and the public of mass atrocities that have occurred as well as those that are yet to occur. Overall, digital satellites have been used to identify possible lessons to guide future mass disaster response operations. For example, the Sudan Satellite Sentinel Project was typically sponsored to report threats to civilians along the contested borders through satellite monitoring launched in 2010 by George Clooney.

8.12 Simulators: Simulation is mimicking a real life situation or crisis. This provides opportunity for humanitarian organisations to use their skills and analyse the framework of best practices. Simulation aids response to disaster and produces efficient and effective results. Participants in this arena are simulated as in real life to assist in intensive planning, co-ordination, collaboration and diplomacy as well as creating awareness on the limitation in time and resources. During the simulation exercise, the tool helps the user to keep record of needs met, track dialogues between actors and prepare them for actual crisis response. An example of a humanitarian simulation exercise is by a group that transforms video game technology into an innovative tool for humanitarian aid and education. It modelled the real life events following a major natural disaster that was about to occur (Virtual Peace, 2008).

8.13 Solar Panel: Recently, solar panel lamps have been used to power refugee camps and other victim camp grounds. This is experienced in Oxfam engineers installing solar lamps as an alternative energy source at a refugee camp in Jordan. For the people, sunlight means safer nights as they are provided with light source at strategic places, including sanitation facilities and the entire streets (Oxfam America, 2013).

9. Implications of Information and Communication Technologies for Humanitarian Services

Before the emergence of information and communication technologies, mass disaster occurred in areas without people being properly informed and educated.

Humanitarian organisations had little or no clue on what disaster type would affect them and government would be running for help due to unpreparedness, especially in terms of budget for the areas affected. This was as a result of lack or dearth of information about what disaster to expect. But with the bridge by information and communication technologies (ICTs), the field of humanitarian response and management worldwide has come alive to help combat complex eventualities and vulnerable populations and also support the data collection process. Information and communication technologies have helped humanitarian organisations to ensure preparedness and create resilience in disaster and emergency times.

The applications of information and communication technologies have recorded significant impact on lives and livelihood during disasters. Much progress has been evident by humanitarian agencies through the use of these current technologies. Communities are well notified on time of disasters through advance warning systems. The use of ICTs has greatly expanded within humanitarian agencies as newly used information and communication technologies such as ATM, cell phone, mapping tools, the Internet and social media have reached millions of victims around the globe with subsequent relief materials and resources. During 2004 Indian Tsunami, text messaging was used by the people affected to communicate their locations to organisations (Nelson, Sigal and Zambrano, 2010). In Katrina 2005, the social media facilitated disaster relief such as collecting online knowledge of missing people as well as locating emergency homes and coordinating volunteers (Nelson et al, 2010).

Many more platforms of the ICTs have assisted government and donor agencies in resource allocation and decision making process. Street map had served the information-hungry organisations of disaster areas details. They used these satellite maps to navigate to unmapped areas during disaster. More often than not, humanitarian organisations have been able to track volunteers and victims and connect those doing operations in the field. As a result of these mentioned information technologies and more, good information flow has been maintained between the actors of humanitarian organisations (from stakeholders to responders and technologists (Patrick and Coyle, 2009).

Information and communication technologies have been used to target geographical communities and help to prepare for disaster signals, early warning and health-related disaster issues, public health awareness as well as gender-related issues. They support engineers in the areas by giving them guidance relief signals. Humanitarian information and communication technologies could be said to be transformational because, across the world, people are using technology to bring possible changes in their own communities (Conneally, 2012). Conneally further states that at the grassroots level, information and communication technologies have strengthened the social power of sharing resources while challenging the old mode of command and control of old analogue method of doing things. With GPS devices, people can be seen or they put themselves in the map and make the invisible, visible. People can find others, places, weather patterns, markets, worship centres, stores and health centres in the map and give the voiceless a voice. In Nigeria, it is noted that open source tools have been used by the Red Cross to gather information from local people to help mitigate the prevalence of malaria (Conneally, 2012).

Information and communication technologies provide faster and cheaper means of doing things than the old analogue method. Through the transformation, humanitarian organisations are beginning to understand the structures and models of the collective voice of people. They are incorporating these technologies into ways of integrating the people to embrace information storage retrieval and transmission.

10. Research Methodology

The qualitative approach was used in this study. Qualitative research is very successful when cultural-specific information about a value, opinion, behaviour etc of a population needs to be obtained. It allows the researcher to explore topics in depth and in more detail than it could offer in quantitative research. The qualitative research approach was used in this study because the research objectives were practical and required the gathering of useful data for in-depth understanding and explanation of the organisation studied. In this work, the entire humanitarian organisation was divided into departments where the heads of units were asked to air an opinion which would best suit the views of other members of their units.

A one-to-one interview was also conducted on a key informant (IT Advisor) in the selected humanitarian organisation. The research adopted the semi-structured interview format to enable the interviewer to have a list of themes and areas to be covered by the interviewees. Apart from the flexible nature of semi-structured interview which allows for significant and in-depth information, this method also allowed for the interviewer to explain the questions as the need arose.

11. The Findings

This study was anchored on four research questions which are answered and discussed as follows:

12.1 Research Question One: What information and communication technologies are used by humanitarian agencies to aid relief?

According to data gathered, the current IT technology in use by WaterAid is *Water Point Mapper*. This is the new technology that the International Programmes Department of WaterAid is using to deliver its services in terms of good water supply to the affected communities. Alongside this technology is *Sanitation Mapper* which is not fully in use but is undergoing a series of tests in vulnerable communities. Apart from the above, the organisation has tried a couple of soft wares to gather information on the extent of the performance of the information and communication technologies in use. One of such ICTs is *crowd sourcing*. Crowd sourcing is a tool used in collecting information from communities and individuals about their use of water supply services. Some complementary information and communication technologies used by WaterAid include GPS device, spreadsheet, mobile phone/smart phones and cameras, Google earth etc.

For Water Point Mapper, there are two different perspectives to this technology. First, it informs development organisations to identify where to implement and collect

information on a regular basis to enable the organisation to measure the performance of their intervention overtime. Secondly, at the local government perspective, it enables them to allocate its resources among sub-districts depending on the needs and keep the information up-to-date. According to the findings, this approach was adopted since 2002 to train local government staff on how to analyse the data they were collecting. Staff went to each water pump, put the Ordinary Survey (OS) (Geographic Information System, GIS, is official mapping software) at the location, then collected information via the GIS and put it into a spread sheet to generate the map. Information and communication technology within this organisation is used to: inform and monitor where WaterAid had implemented or intervened; promote sustainability; inform new planning, fit into record and evaluation of projects. The technology also is used to identify the beneficiaries served by the organisation.

11.2 Research Question Two: What are the reasons for applying these information and communication technologies in humanitarian relief?

The reasons for using these ICTs are, among other things, to promote and secure poor people's access to safe water as well as improved hygiene and sanitation. The ICTs are also meant to support service providers and government in developing their capacity to deliver safe water, advocate the essential role of safe water as well as improved hygiene and sanitation in human development, and further develop as an effective global organisation recognised as a leader in the field of values.

11.3 Research Question Three: How are the identified information and communication technologies used in humanitarian services?

The water point mapper technology has been used in planning and improving accountability of the water sector performance at both local and national levels; displaying non-functional and semi-functional water sources as well as areas where technical and cost recovery support is lacking (WaterAid, 2010). In identifying inequality in service supply in each part of a country where the organisation works, water point mappers are used in displaying the distance that each community will have to travel to spot a water source. Thus, this ICT helps in spotting out the type of water source available before the organisation moves to meet the needs of dwellers.

Also, the water point mapper is used to obtain good water quality. This instrument is also used in mapping high risk contaminants. It supports the production of maps with all necessary information attached (a range of data summary can be viewed in the information bubble by a mere click on the water spot icon) without the need of a GIS (Geographic Information System) software or Internet connection (WaterAid, 2010). By so doing, Water Point Mapper uses Microsoft Excel Spreadsheet which will convert the data captured by the instrument into Google Earth. When running the data on Google Earth offline machine, the maps produced can be saved as images and can be shared to any device (WaterAid, 2010).

Alongside water point mapper is another monitoring and decision support technology called Sanitation Mapper. Sanitation mapper is a tool which can be used in both area-based mapping (village level coverage) and point-based mapping (shared pit latrines or

slum) to provide useful information for decision making at districts and sub-districts level (Share, 2012). The information gathered is solely for NGOs' or Community's advocacy and accountability purposes. It consists of data collection sheets, which the user translates into maps.

11.4 Research Question 4: Does the use of information and communication technologies in humanitarian relief give any degree of satisfaction?

According to WaterAid, the Water Point Mapper, so far, is the best and only tool in which WaterAid is using mainly to support local government to be able to allocate resources. Data indicate that since its release, the mapping software has been downloaded in more than 160 countries, with many governments using it in every district within their countries to inform local level planning. In East Africa, the software is used to inform the internal aspect of WaterAid's programming. There, WaterAid tries to institutionalise (district wide approach) the use of the mapping tool to supply boreholes where they are needed for efficient water access. According to the findings, beneficiaries are happy to use the facility because it does not only help the community's planning process but it also monitors evaluation and fits directly into WaterAid's evaluating process.

The data indicate that the level of satisfaction derived is in two parts. Firstly, users express excitement in being able to use the technology for the first time to allocate resources in their districts. They are able to actually see on a map, a special representation of where their communities are and where the water is. The representation of their communities on a map brings striking images to the users which make them to use the software quite quickly and efficiently for allocating resources. On the map, the green areas indicate the high functionality level while the red area represents a low level of functionality which is used for rehabilitation of water points.

Secondly, the organisation views the mapping tool as excellent in improving people's access to water supply services because it has informed planning. For example, in Ethiopia, a small number of districts of a local government have used the maps to mobilise funding. Hence, governments and donors are content and are much more willing to fund projects in the districts with the direct needs. Therefore, from the perspectives of the organisation and the users, there is a level of satisfaction in applying the technologies.

12. Conclusion

In the light of the above findings, it is concluded that different current information and communication technologies are being applied in the operations of humanitarian relief depending on the disaster type and disaster phase. It is also concluded that despite the numerous benefits these information and communication technologies offer, the users are still faced with some challenges posed to them by the technologies.

13. Recommendations

From the findings above, it is here recommended that:

- 1) The government of disaster affected regions should extend regulatory agenda to incorporate current information and communication technologies that are being designed and implemented by humanitarian organisations as well as the international humanitarian community to create a legal structure for humanitarian agencies to follow.
- 2) Humanitarian organisations should strive for accurate adaptation of data obtained from mapping devices (smart phones and mapping software) to be able to verify the information source and avoid duplication. By this, every actor (aid giver, responder, donor, government etc) should be engaged as part of the team to bridge the risk of authentication of information during the disaster phases.
- 3) Humanitarian relief responders who are not of the same cultural background with the victims should be given proper training on the way of life - especially language – of the people. This is very feasible when early warning technologies have been employed to know where the next disaster is about to happen.

References

- Arthur, W. (2009). *The Nature of Technology: What It Is and How It Evolves*. Available at <<http://books.google.co.uk/books?id=3qHsXYXN0EC&printsec=frontcover&dq=how+IT+technology&hl=en&sa=X&ei=EmmUYHZG7D60gWxoDgCg&sqi=2&ved=0CDEQ6AEwAA#v=onepage&q=how%20IT%20technology&f=false>> [16 May, 2009].
- Barnett, M. & Weiss, T. (2011). *Humanitarianism: A Brief History of the Present*. Available at <http://books.google.co.uk/books?id=YDj1PUrtfAEC&pg=PA1&lpg=PA1&dq=humanitarianism+a+brief+history+of+the+present&source=bl&ots=Eh2Xs1G_DY&sig=Wedwc3liSjavkZ66LzNiUC9QCGE&hl=en&sa=X&ei=iYcuUdrxN6qK4AS_84A4&ved=0CD4Q6AEwAg#v=onepage&q=humanitarianism%20a%20brief%20history%20of%20the%20present&f=false> [20 January, 2013].
- Barnett, M. (2011). *Humanitarianism in Question: Humanitarianism - A Brief History of the Present* Available at <http://books.google.co.uk/books?id=6kbaFEhuIXkC&pg=PA266&lpg=PA266&dq=humanitarianism+a+brief+history+of+the+present&source=bl&ots=Cwe3NzueS1&sig=xuOUm5Vn1o4ksWJeNCDO_Mg6U&hl=en&sa=X&ei=iYcuUdrxN6qK4AS_84A4&ved=0CEIQ6AEwAw#v=onepage&q=humanitarianism%20a%20brief%20history%20of%20the%20present&f=true> [21 January, 2013].
- Bauduy, J. (2010). Mapping a Crisis: One Text Message at a Time. *Social Education*, 74(3), 142-143
- Brown, U. & Gould, D. (2005). Identifying Victims after a Disaster. Available at <<http://aaanet.org/press/an/1105/Gould.htm>> [28 July, 2013].
- Central Texas VOAD. (2009) *When Disaster Strikes*. [online] available from <<http://www.slideshare.net/ctxvoad/community-disaster-preparedness>> [20 MAY 2013]
- Cirillo, A. (2013) *Disaster Planning in Long-Term Care: First the Plan then the Prep*. [online] available from <<http://assistedliving.about.com/od/runningyourbusiness/a/disasterprep.htm>> [31 JULY 2013]

- Conneally, P. (2012) Digital Humanitarianism. Available at <http://www.youtube.com/watch?v=L9_c1j9VRwE&list=PLFD503D3843018BF2> [2 August, 2013].
- Desanctis, G. & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organisation Science*, 5, p. 123.
- Destination Recovery Services, (2007) *The Disaster Lifecycle*. [online] available from <<http://www.destinationrecovery.com/disasterlifecycle.html>> [20 APRIL 2013]
- Giddens, A. (1978). *Politics, Sociology and Social Theory: Encounters with Classical and Contemporary Social Thought*. Stanford: Standard University Press.
- Global Humanitarian Assistance. (2013). *Defining Humanitarian Aid*. Available at <<http://www.globalhumanitarianassistance.org/data-guides/defining-humanitarian-aid>> [15 July, 2013],
- Goldberg, M. (2011). Haiti, One Year On: Technology and the Future of Humanitarian Aid. Available from <<http://www.undispatch.com/haiti-one-year-on-technology-and-the-future-of-humanitarian-aid>> [23 July, 2013]
- Handmer, J. and Dovers, S. (2013) *Handbook of Disaster Policies and Institutions Improving Emergency Management and Climate Change Adaptation*. [online] available from <<http://lib.myilibrary.com/Open.aspx?id=425499&src=0>> [28 JUNE 2013]
- H e s s m a n , T . (2 0 1 3) . T e c h n o l o g y . A v a i l a b l e a t <<http://www.industryweek.com/technology?pid=googleaw>> [20 May, 2013],
- Jackson, B.; Sullivan, F., and Willis, H. (2010) *Evaluating the Reliability of Emergency Response Systems for Large-Scale Incident Operations*. [online] available from <<http://site.ebrary.com/lib/coventry/docDetail.action?docID=10425080>> [20 JULY 2013]
- Jorgustin, K. (2011) *The Four Stages of Disaster*. [online] available from <<http://modernsurvivalblog.com/natural-disasters/the-four-stages-of-disaster/>> [21 JUNE 2013]
- Kemerer. C. (1998). Information Technology and Industrial Competitiveness: How it shapes Competition. Available at <http://books.google.co.uk/books?id=K66WzNQWHogC&printsec=frontcover&dq=how+IT+technology&hl=en&sa=X&ei=_pKnUe-uIMmX0AXs3IDQBg&sqi=2&ved=0CEgQ6AEwBA> [20 May, 2013],
- King, H. (2013). Obsidian: What Is Obsidian, How Does It Form and What Is It Used For? [online] available from <<http://geology.com/rocks/obsidian.shtml>> [3 MAY 2013]

- Nelson, A., Sigal, I. & Zambrano, D. (2010) *Media, Information Systems and Communities: Lessons from Haiti*. Available from http://www.knightfoundation.org/research_publications/2011-01_haiti/kf_haiti_report_english_cx2.pdf [31 JULY 2013]
- Ohlhorst, F. (2012) Big Data Analysis: Turning Big Data into Big Money [online] available from <http://site.ebrary.com/lib/coventry/docDetail.action?docID=10630556> [30 May, 2013].
- Oxfam America. (2013.) *How Solar Power is Helping Syrian Refugees*. Available at <http://blogs.oxfam.org/en/blogs/13-08-08-how-solar-power-helping-syrian-refugees> [9 AUGUST 2013]
- Oxford Dictionaries (2013) *Technology*. [online] available from <http://oxforddictionaries.com/definition/english/technology> [2 May 2013]
- Parker, D. (1992) *The Mismanagement of Hazards- Hazard Management and Emergency Planning, Perspective on Britian*. London, James and James
- Patrick & Coyle (2009.) *New Technologies in Emergencies and Conflicts: The Role of Information and Social Networks*. Washington, D.C. and London, UK: UN Foundation-Vodafone Foundation Partnership. Available from http://www.globalproblems-globalsolutions-files.org/pdf/UNF_tech/emergency_tech_report2009/Tech_EmergencyTechReport_full.pdf [2 August, 2013].
- Queensland Government. (2013) *Disaster Management Phases*. [online] available from http://www.disaster.qld.gov.au/About_Disaster_Management/Management_Phases.html [28 MARCH 2013]
- Rosenberg, M. (2013) *The Disaster Cycle Preparedness, Response, Recovery, and Mitigation are the Disaster Cycle*. [online] available from <http://geography.about.com/od/hazardsanddisasters/a/The-Disaster-Cycle.htm> . [31 JULY 2013]
- Royal College of Nursing. (2013). *Telehealth and Telecare*. Available at http://www.rcn.org.uk/development/practice/e-health/telehealth_and_telecare [4 August, 2013].
- Save the Children and Oxfam (2012) *A dangerous delay: The cost of late response to early warnings in the 2011 drought in the Horn of Africa. Joint Agency Briefing Paper*.
- Share. (2012). *Mapping Sanitation Facilities in Bangladesh*. Available at http://www.sharereseach.org/NewsAndEvents/Detail/_sanitationmapperpilot [12 July, 2013].
- Smith, G. (2012) *New Technologies in Cash Transfer Programming and Humanitarian Assistance*. Available from <http://www.odihpn.org/humanitarian-exchange-magazine/issue-54/new-technologies-in-cash-transfer-programming-and-humanitarian-assistance> [13 August, 2013].

- Syed, M. (2009) *Encyclopaedia of Disaster Management, Volume 1*. [online] available from <<http://site.ebrary.com/lib/coventry/docDetail.action?docID=10416347>> [28 JUNE 2013]
- Taylor et al. (2012) *The State of The Humanitarian System*. [online] available from <<http://www.alnap.org/pool/files/alnap-sohs-2012-lo-res.pdf>> [20 APRIL]
- Virtual Peace. (2008) About Virtual Peace. Available at <<http://www.virtualpeace.org/about.php>> [30 July, 2013].
- WaterAid, UK. (2013). Where We Work: Africa. Available at <<http://www.wateraid.org/where-we-work#/africa>> [18 June, 2013].
- WaterAid, UK. (2013). Where We Work: Americas. Available at <<http://www.wateraid.org/where-we-work#/europe>> [18 June, 2013].
- WaterAid, UK. (2013). Where We Work: Asia and Pacific. Available at <<http://www.wateraid.org/where-we-work#/asia-and-pacific>> [18 June, 2013].
- WaterAid, UK. (2013). Where We Work: Europe. Available at <<http://www.wateraid.org/where-we-work#/europe>> [18 June, 2013].
- WaterAid, UK. (2013). *Who We Are*. Available from <<http://www.wateraid.com>> [17 June, 2013].
- WaterAid, UK. (2013). Who We Are: Our History - 1980s. Available at <<http://www.wateraid.org/uk/who-we-are/our-history#/jehfgfies-cgcg>> [18 June, 2013].
- WaterAid, UK. (2013). Who We Are: Our History - 2000s. Available at <<http://www.wateraid.org/uk/who-we-are/our-history#/afieieies-cgcg>> [18 June, 2013].
- WaterAid, UK. (2013). Who We Are: Our History - 2010s. Available at <<http://www.wateraid.org/uk/who-we-are/our-history#/afiejeies>> [18 June, 2013].
- WaterAid, UK. (2013). *Who We Are: Our History- 1990s*. Available at <<http://www.wateraid.org/uk/who-we-are/our-history#/jehfhfies-cgcg>> [18 June, 2013].
- WaterAid, UK. (2013). Who We Are: Our History Overview. Available at <<http://www.wateraid.org/uk/who-we-are/our-history#/overview-cgcg>> [17 June, 2013].
- WaterAid, UK. (2013). Who We Are: Our Strategy. Available at <<http://www.wateraid.org/uk/who-we-are/our-strategy>> [18 June, 2013],
- Yeo, D. (2013). A Good Start, but G8 must try hard on Accountability. Available at <<https://www.devex.com/en/news/a-good-start-but-g8-must-try-harder-on/81201>> [18 June, 2013].
- Yvan, C. (2002) *The Conduct of Humanitarian Relief Operations*. Available at <http://cdn.peaceopstraining.org/course_promos/humanitarian_relief_ops/humanitarian_relief_ops_english.pdf> [15 June, 2013].