

Developing Information Technologies for Citizens Experiencing Disruption: The Role of Trust and Context

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ABSTRACT

This paper considers a subset of the technology-enabled communication that took place among citizen populations experiencing various disruptions, e.g. disaster and war. In the context of a disrupted environment, trust can erode where people no longer rely on institutions for support (i.e. the government), or where citizens do not trust other people. We argue that depending on what is taking place in the physical world, trust in people, information, and institutions can change – in this sense, trust is contextual. We then offer recommendations for designing new technologies for people who experience disruption, taking into account trust and context.

Keywords

Disruption, information technology, trust, context, design.

INTRODUCTION

Recently, various studies have looked at the ways in which Information Technology (IT) is used by citizens who have experienced various crises (i.e. disaster and violent conflict), for purposes of communication and coordination, to obtain and disseminate information, as well as to repair work, education, and social practices. Whereas much work has focused on the ways in which IT can support emergency management and decision-making by formal response organizations during crisis (e.g. Turoff et al, 2004), understanding the role IT plays for citizens is becoming increasingly important.

On the one hand, case studies have highlighted the role of IT by citizens directly and indirectly affected by various disruptions caused by natural disasters and conflict. When citizens experience natural disaster, they are highly innovative in their use of IT (e.g. Sutton et al., 2008), as citizens are now often seeking and providing information to others by adopting and re-appropriating various technologies (Palen and Liu, 2007). For example, during the Southern California Wildfires, people used Google maps to produce annotated mash-ups with relevant information, e.g. burn areas, evacuation centers, and shelters. Craigslist, which is generally used as a free online classified advertisement forum, was used following Hurricane Katrina to offer various forms of assistance, such as housing and employment opportunities (Hughes et al., 2008).

Other case studies have revealed how citizens experiencing conflict have used technology in order to act. For example, following the September 11th attacks on the World Trade Center, people converted company websites, personal blogs, and public websites to information hubs, which were then used by citizens to access or provide information and assistance (e.g. Palen and Liu, 2007). During the Virginia Tech and Northern Illinois University shootings, people came together online and collectively engaged in list-building exercises, identifying the names of victims before official sources (Palen and Vieweg, 2008; Vieweg et al., 2008). In Iraq, people used IT during long term violent conflict to maintain work and social life, enable safe travel, obtain trustworthy information, and continue social practices, despite experiencing disruption (Mark and Semaan, 2008; Mark et al., 2009).

These examples illustrate that people use IT to maintain various practices in addition to enabling them to seek information and aid from various sources during disruption (Mark and Semaan, 2008). These examples are also a sharp contrast to the typical model in which information and aid are typically provided by official authoritative sources (e.g. relief organizations and the local government) to the public (Palen and Liu, 2007). Today it is often the case that people also rely on “back-channel” information providers (i.e. friends, family, and blogs), instead of relying solely on authoritative sources for information during disruption (Sutton et al., 2008). For example,

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people now rely on word-of-mouth information sources e.g. friends and family, as well as other sources e.g. blogs, websites, and Twitter, for information (Hagar and Haythornthwaite, 2005; Shklovski et al., 2008; Sutton et al., 2008). Thus, normal citizens utilizing IT acting as unofficial sources, as opposed to authoritative entities, often emerge to provide relief e.g. information and assistance, during disruption (Palen and Liu, 2007).

IT designed specifically to help people mitigate the effects of disruption are important so that people can continue to act, e.g. to maintain work and social practices, as well as to engage in information acquisition and dissemination. For example, it has been suggested that we design technologies that gather the citizen-generated, back-channel information from unofficial sources, e.g. online forums, blogs, and Social Networking Sites (SNSs), so that it may be leveraged and disseminated by authorities (Palen and Liu, 2007). While we do in fact agree that new technologies must be developed, here we offer a new perspective for those who wish to develop technologies for people experiencing disruption – one that takes into account the role trust and context play in affecting citizen behavior during disruption.

When disruption takes place, it is imperative for people and information to be reliable and trustworthy. First, citizens seeking information may have trouble discerning between trustworthy and untrustworthy sources of information, as a multitude of official and unofficial sources may become available to them. Second, many people may enter the area affected by disruption, e.g. NGO groups, people from neighboring cities, militia groups, and even insurgents. The multitude of actors, depending on the situation, may make it difficult for those affected by disruption to know who can be trusted. During violent conflict, for example, it may be dangerous for people to interact with strangers, as societal trust can decline (Colletta and Cullen, 2000).

In this paper we argue that trust in people, information, and institutions can change (or not) depending on what is taking place in the physical environment – as such, trust and context are linked. By doing this, we develop new perspectives regarding the implementation and design of new IT to aid citizens who experience crises.

Trust as a mediator in information-seeking and interactions

We are interested in how trust in people, information, and institutions can change depending on context. The term trust, in its most basic form, is concerned with how people “manage expectations” (Handy, 2000). Trust is generally defined as a positive characteristic (Al-Ani and Redmiles, 2009). In this view, positive trust is established when people and institutions meet an individual’s expectations. However, when people and institutions fail to meet an individual’s expectations, negative trust arises, leading to a lack of trust caused by negative expectations (Al-Ani and Redmiles, 2009). As human beings, it is only natural that we often hold expectations of others, as well as institutions, in various contexts during normal situations. Those who experience disruption also hold expectations of others and institutions.

Trust can mediate interactions between people, and between people and institutions (Lee and See, 2004). Trust as a mediator between people is referred to as *interpersonal trust* (Abdul-Rahman and Hailes, 2000). In most situations when hailing a taxi or when taking the bus to school or work, we have the expectation that the driver will deliver us to our location, and do not have the negative expectation that the driver has the intention of harming us. Trust as a mediator between people and institutions is referred to as *impersonal trust*, or system trust (Shapiro, 1987). In this case, people may hold certain expectations about the institutions on which they rely. People who live in Canada or Sweden, for example, trust that their government will provide them with free health care in the event of an illness.

We adopt a view of trust from *cognitive* and *affective* perspectives derived from previous work (Wilson et al, 2006; Jarvenpaa, Knoll, and Leider, 1998). Cognitive trust refers to an individual’s ability to trust others and institutions based on their performance. When people and institutions perform in accordance with our expectations, then positive cognitive interpersonal and impersonal trust exists. During disruption, affected populations may hold the expectation that the government, for example, will provide them with correct and timely information and support. If they do not meet people’s expectations, then people may develop negative conceptions of the government’s abilities (e.g. Sutton et al., 2008, Hagar and Haythornthwaite, 2005; Shklovski et al., 2008). Affective trust, on the other hand, refers to an individual’s ability to trust that an individual or institution will act appropriately and not deceptively. Thus, if the government obtains accurate information at the right time, will they make the information available to the people? For example, during the SARS outbreak in China, the Chinese government purposefully hid information from its citizens, leading to negative manifestations of affective trust to develop (Tai and Sun, 2007). As such, during both disaster and war, negative conceptions of trust may arise depending on the physical world context.

	Impersonal	Interpersonal
Cognitive	Trust in institutions based on abilities/performance.	Trust in other people based on their abilities/performance.
Affective	The ability to trust that an institution will not be deceptive.	The ability to trust that other people will not be deceptive.

Table 1: Trust Definitions

Context and interaction

Several relevant communities emphasize the importance of incorporating context into the design of interactive systems (e.g. CSCW and HCI communities). Context, in this view, is often referred to as the setting in which action unfolds. By better understanding the setting in which technology is to be used, system designers can then make more informed decisions with respect to the design of systems in their actual settings (Suchman, 1987).

Building on Suchman's notion that context incorporates people's actions, and is neither stable nor pre-determined, Dourish (2004) claims that context is an *emergent property* of interaction. Thus, we negotiate context through our interactions – these interactions can take place with others and institutions. During disruption, our interactions with others and the institutions on which we rely can change. Consequently, when the interactions we are accustomed to change as a result of what is taking place in the physical world, negative conceptions of trust may form. It is this dynamic, interaction-based context and the resulting changing notions of trust that we will explore for the remainder of this paper.

RESEARCH METHODOLOGY

In order to make our perspective of trust and context more tangible, we draw on case studies from our own research (Mark and Semaan, 2008; Mark et al., 2009), as well as those conducted by our colleagues (Hagar and Haythornthwaite, 2005; Tai and Sun, 2007). Our data consists of semi-structured interviews we conducted with civilians experiencing the Israel-Lebanon war that took place in August 2006, and the current war in Iraq beginning in March 2003. The various studies we draw from are diverse with respect to the type of disruption, e.g. war and disaster, as well as diverse in terms of population characteristics, as these studies take place in a variety of countries (the United States, the United Kingdom, China, Iraq, and Israel).

Our study of Israeli and Iraqi civilians is part of a larger, ongoing study in which we investigate how technology allows people to act when experiencing disruption (Mark and Semaan, 2008). We have conducted 85 semi-structured telephone interviews. We conducted 40 interviews from October 2006 through July 2007 with participants living in Israel during the conflict in August 2006, and 45 interviews with Iraqis living through the current Gulf War beginning in March 2003. Breakdowns of the various cases we discuss in the subsequent sections of this paper are summarized in Table 2.

TRUST AND CONTEXT: CASE STUDIES OF POPULATIONS EXPERIENCING DISRUPTION

Weick (1993) contends that people must interact in a respectful manner and trust one another in order for them to overcome disruption. When a disruption takes place, in re-negotiating context, people may find that negative expectations about trust exist and may change their behaviors accordingly.

Context and changing notions of impersonal trust

We will now turn to case studies to explore the relationship between context and impersonal trust. In order to highlight this change, we will contrast a situation where cognitive impersonal trust remained positive (Israel), with situations where negative expectations developed (Iraq, the United Kingdom, and China).

	Country	Pre-event Activity	Event/Citation	Post-event	Solution
interpersonal	Iraq	Self Transportation Trust in strangers: (1) transportation, (2) directions, people felt safe	War 2003-Ongoing (Mark and Semaan, 2008)	Decline in interpersonal affective trust (1) Fake road blocks, bombings, militias; (2) People no longer asked strangers for directions, or traveled with people they did not know	(1) Used mobile phones to develop travel information networks
	Iraq	Social Life (1) Trusted others not to harm them if they did not speak out against regime; (2) Went to social clubs, e.g. sports and recreation	War 2003-Ongoing (Mark et al., 2009)	Decline in interpersonal affective trust (1) People did not trust strangers; (2) New relationships took a lot of time to develop	(1) Used technology, e.g. IM, SNSs, to maintain relationships and establish new relationships
	China	Information Trusted others not to spread rumors	SARS Epidemic (Tai and Sun, 2007)	Decline in interpersonal affective trust (1) Chinese citizens were spreading rumors	(1) Used cell phones to validate information with kin
	Israel	Trust in others Trusted other Israelis not to harm them.	Israel-Lebanon war August 2006 (Mark and Semaan, 2008)	Interpersonal trust did not decline (1) Secure borders; (2) insurgents did not enter; (3) Israelis were not spreading rumors or fear mongering; (4) Hiring new employees in the workplace	
	UK	Trust in others	Foot and Mouth Disease outbreak in Cumbria (Hagar and Haythornthwaite, 2005)	Interpersonal trust did not decline (1) Farmers continued to help one another; (2) Accepted help from outsiders	(1) Connected with others via telephone and online forums
Impersonal	Iraq	Institutional Support Trusted Gov't to provide: (1) electricity; (2) gasoline; etc. Negative affective trust in institutional information practices	War 2003-Ongoing (Mark et al., 2009)	Decline in impersonal cognitive trust Government did not provide people with (1) necessities, and considered (2) incompetent with respect to info	(1) Developed community infrastructures; (2) Used technology to obtain information from kin
	UK	Information and Aid People held the expectation that institutions would provide (1) timely and accurate info. and aid; (2) procedural info.	Foot and Mouth Disease outbreak in Cumbria (Hagar and Haythornthwaite, 2005)	Decline in impersonal cognitive trust Institutions were slow to provide information and aid to farmers whose farms had been hit by the disease	Used technology, e.g. online forums and telephone, to obtain relevant information from both strangers and trusted contacts
	China	Information Citizens held the expectation that institutions would provide them with information in the event of a disruption	SARS Epidemic (Tai and Sun, 2007)	Decline in impersonal affective trust Government purposely hid information from its citizens; did not act appropriately.	Used mobile phones to connect with kin to validate information
	Israel	Institutional Support Gov't provided citizens with (1) electricity, (2) information, etc.	Israel-Lebanon war August 2006 (Mark et al., 2009)	Impersonal trust did not decline (1) Institutions continued to run as expected, despite disruption	

Table 2: Examples of Trust and Context Broken Down by Country

Context and positive cognitive impersonal trust: the Israel-Lebanon War

During the Israeli-Lebanon conflict of 2006, impersonal trust did not decline within the country. The war was concentrated in the north of Israel. The borders, however, remained secure. While there were reports of insurgents entering the country, the numbers were limited, and the Israeli military was strong. The institutions

on which people relied before the war remained intact. In our interviews, people reported that they constantly monitored information through their television sets, radios and the Internet, as the government provided them with constant updates regarding the situation, and on how to act. For example, government and community-enabled siren warning systems were in place to warn people of bombs. These would be sent to people via SMS in some cases (mostly within communities), and sirens were also littered throughout the country so that people could hear when to take precautionary measures, e.g. to run to a shelter. Additionally, electricity, Internet, and all of the basic amenities did not fail throughout the duration of the war.

Context and declining impersonal trust: The current Gulf War in Iraq

Our Iraqi informants who were living in Iraq during the current Gulf War, reported that to a certain extent impersonal trust existed before the war. They still held certain positive expectations of the government. For example, Saddam's regime succeeded in repairing Iraq's infra-structure (e.g. electricity) to some degree soon after the war of 1991. Negative conceptions of affective trust coexisted simultaneously with this cognitive impersonal trust. Iraqis generally feared slandering the government in the presence of a government sympathizer because this could potentially lead to negative consequences. Furthermore, the government controlled the information its citizens received. It only provided its citizens with information it wanted people to have, leaving people largely uninformed during and after every war. For example, our informants reported that the government ran all the television news stations, and all of the information they received was from the government's point of view.

The new Iraqi government was not able to provide basic necessities during or after the war, unlike in Israel. Consequently, negative ideas of trust have developed with respect to the new Iraqi governments' abilities – negative cognitive impersonal trust has developed. Our Iraqi informants report that they do not believe that the current government will provide them with basic services, e.g. electricity. They also reported that they no longer feel the government is competent in providing its citizens with relevant information, which is further exacerbated by the fact that they cannot rely on new sources of information, e.g. multiple newspapers and television stations.

Iraqis mitigated the effects of the new context by utilizing the ITs that became available following the war. First, people began to develop redundant infrastructures to supply electricity within their own neighborhoods (Mark et al., 2009). For example, individuals living in neighborhoods purchased generators, and ran wires to people's homes throughout their neighborhood, providing them with electricity for a monthly fee. Second, technologies that enabled the supply of trustworthy information were also obtained. For example, mobile phones have allowed Iraqis to connect with people who they trust in order to seek news, as well as validate news sources (Mark et al., 2009). Moreover, Iraqis typically stated they rely on news sources recommended by people they trust. They are also validating news sources with others through discourse and analysis, by comparing sources with what they hear from friends and family. A similar information validation practice was observed in other disrupted contexts as well (e.g. Tai and Sun, 2007).

Context and declining cognitive impersonal trust: The Foot and Mouth Disease Outbreak in the UK

Negative trust towards government performance also arose during Foot and Mouth Disease outbreak in Cumbria, a rural area in the UK (Hagar and Haythornthwaite, 2005). The Foot and Mouth Disease was one of the largest crises to affect the UK farming system, leading to the slaughter of thousands of livestock in the process. It is an infectious viral disease that can affect livestock, e.g. cows and sheep. In an attempt to contain the disease, farmers were socially isolated and could not leave their farms. Additionally, people were not allowed to enter the countryside. Farmers needed information that would give them instruction on how to proceed in their local situation (i.e. how to diagnose their farm animals, and other farms that were infected). This new context led to negative manifestations in the government's ability to provide relevant information. First, the way in which the government handled the crisis traumatized farmers; rather than quarantine animals and allow them to recover on their own, the new policy was to slaughter all infected livestock which was shocking. Second, information from local authorities and government sources was slow moving, and oftentimes out of date. The government often sent leaflets in the mail, and operated a telephone network. However, by the time people received their mail, new procedures had already been developed. Similarly, when people tried to call the telephone hotline, they were unable to reach anyone.

In order to obtain information, farmers used their telephones to call their local connections e.g. other farmers. Also, by adopting the Internet and a local community network known as Pentalk, farmers were able to receive information from local farmers online, as well as from farmers living abroad who had experienced similar disruptions. This practice, where farmers relied on technology in order to obtain relevant information is similar

to what others reported during other disasters (e.g. Shklovski et al., 2008), and allowed people to obtain timely and accurate information.

Context and changing notions of affective impersonal trust: The SARS Outbreak in China

Chinese citizens developed negative affective trust in their government following the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 (Tai and Sun, 2007). First, SARS began to spread in the south of China, and subsequently, cases began to appear throughout other provinces in China, as well as in neighboring countries. The Chinese government had full control over the media in China and Chinese citizens held the expectation that the government would inform them in the event of a crisis. However, the government instructed all outlets, e.g. television and newspaper news sources, not to publish any SARS related stories and purposefully limited the flow of information to the general public.

The restrictions placed on information given by the Chinese government were intended to decrease the likelihood of mass panic. People began passing away and consequently news regarding the virus began to spread within China. The pointed and well-documented attempt to conceal the virus led people to believe that their government was not going to act appropriately - negative affective impersonal trust developed.

People in China turned to others that they trusted to seek information. Chinese citizens began to call friends and loved ones littered throughout China to discuss the spread of the disease using cellular phones. People relied on their physical world social networks for valid and trustworthy information, when they no longer felt the government was trustworthy.

Context and changing notions of interpersonal trust

We will now turn to case studies to explore the relationship between context and interpersonal trust. In order to highlight this change, we will contrast situations where affective interpersonal trust did not decline (The UK and Israel), with situations where negative expectations of people developed (Iraq and China).

Context and positive interpersonal trust: The United Kingdom and Israel

In a project studying the way in which farmers used technology during the Foot and Mouth Disease outbreak in Cumbria, a rural area in the UK (Hagar and Haythornthwaite, 2005), local citizens whose farms were affected by the disease continued to trust others. Whereas the government was no longer reliable with respect to information dissemination and assistance, farmers continued to rely on other people both within and outside of Cumbria for support. Farmers found that they could receive accurate and up-to-date information by connecting with community members over the phone or online.

In Israel, Israeli citizens continued to trust one another. Through analysis of informants reports, we found that several factors contributed to this, despite the fact that Israelis were experiencing violent conflict (from an external enemy). First, Israeli citizens did not act negatively towards one another. For example, people did not spread rumors or generate fear. Additionally, people who lived in locations throughout the center and south of Israel who were not affected by the war, constantly offered support to people living in the north. For example, people placed ads in the newspaper and on television for people who were seeking a safe getaway from the bombing, by inviting them to live with them. In both of these cases, interpersonal trust continued to exist.

Context and declining affective interpersonal trust: the current Gulf War in Iraq

Our informants, Iraqis who lived in Iraq during the current Gulf War, reported that to a certain extent interpersonal trust existed before the war. While they did not feel safe discussing sensitive information (i.e. negative feelings or attitudes towards the government) with strangers because of the possible negative outcome, people felt they could trust strangers not to harm them. Iraqi citizens felt safe traveling to the various provinces throughout Iraq to visit friends and family, to attend sporting events and social clubs, and to travel to work and school. People also felt comfortable approaching strangers to ask for directions, and making new friends within the country was similar to the way in which people would make friends in other parts of the world.

While positive expectations of others existed in Iraq before the war, our informants report that today things have changed - Iraqis no longer feel safe living in the country. Unlike what our informants reported in Israel, following the Gulf War, the government was unable to secure the borders, and as a result, various insurgents and militia members have entered the country, and the sectarian violence between the Sunnis and Shiites has not been contained. Second, the government has installed roadblocks at certain intervals, but oftentimes, fake roadblocks are setup by a competing sect, which are difficult to differentiate from official ones. If a person of

the “wrong” sect is to stop at a non-official roadblock, the consequences could be drastic. Third, following the war, sectarian violence between the Sunni’s and Shiites has continued to escalate. Whereas before the war Sunni’s and Shiites lived together in the same neighborhoods, our informants report that today sect-based neighborhoods have emerged. As a result, a large and sudden convergence of strangers into our informants’ neighborhoods has taken place, while in many cases, friends and family members have left Iraq and are now living in other countries, further creating an environment of interpersonal mistrust. Thus, our informants reported that they did not trust strangers in any capacity.

In order to maintain practices and travel as safely as possible, Iraqis, equipped with cellular phones, developed cell-phone information networks (Mark et al., 2009). In this case, people would contact someone in their particular community, such as a work colleague or a peer at the university, in order to seek, as well as provide information about roadblocks and alternative travel routes. Additionally, in order to maintain social life, the lack of interpersonal trust in the physical environment and the difficulty traveling led our informants to maintain relationships, as well as develop new relationships, online via Social Networking Sites (SNSs), Instant Messenger, e-mail, and chat rooms. This allowed people to maintain a social life, but in a safe environment (Mark and Semaan, 2008).

Context and declining affective interpersonal trust: The SARS Outbreak in China

In a study looking at how IT was used by the Chinese population following the SARS outbreak (Tai and Sun, 2007), unlike in Israel, Chinese citizens developed negative affective interpersonal trust.

When SARS began to spread in the south of China, in 2003, as people began to pass away, Chinese citizens began spreading rumors about the disease, much of which was inaccurate. This led to a decline in affective interpersonal trust amongst Chinese citizens.

In order to seek information, people turned to others that they trusted. Using cellular phones, Chinese citizens began to call friends and loved ones littered throughout China to discuss the spread of the disease, and cross-validate information. As such, people relied on their physical world social networks for valid and trustworthy information, when they no longer felt the government was trustworthy. A similar cross-validation practice was reported in other studies as well (Mark et al., 2009; Qu et al., 2009).

DISCUSSION

Our study showed that trust in people, information, and institutions is contextual – as the interactions between people and institutions changed as a result of what was taking place in the physical world, trust either declined, or it did not. Our goal in this paper was to show how understanding the role between trust and context can allow us to provide recommendations to those who wish to develop technologies for citizens living through disruption. In order to provide recommendations, we must first describe when trust does and does not decline, and look at the solutions people experiencing disruption have developed to ameliorate the decline of trust in their situations.

On the one hand, impersonal trust can decline. First, when institutional support before a disruption is strong with respect to the basic amenities people rely on, e.g. electricity, yet falters following or during a crisis, negative impersonal trust can develop. Second, when the expectation of citizens is that their institutions will provide them with accurate and timely information during a crisis, but find that when information is provided from authoritative sources who are slow to provide information, or information is inaccurate, negative impersonal trust can also develop. Lastly, when authorities, who are expected to provide information, purposefully hide relevant, potentially life-threatening or lifesaving information from citizens, negative impersonal trust can develop. However, the lack of impersonal trust in the case studies we utilized emphasizes the importance of self-organization, as well as IT, in crisis situations. For example, we reported how people have self-organized within their communities to re-develop infrastructures to provide electricity. Additionally, people often utilized technology, e.g. cellular phones and blogs, to seek information from trusted contacts, or, as was the case during the Foot and Mouth Disease Outbreak, from strangers. This practice, of going outside of ones’ location to obtain information from strangers, is becoming commonplace during disruption (e.g. Palen and Liu, 2007), and it may go a long way in enabling people to maintain trust.

On the other hand, interpersonal trust can decline. Whereas before a disruption people often interact with one another in a respectful manner, when a disruption takes place, people may hold the expectation that people will work to benefit the common good. When the expected way in which people interact with one another changes or becomes harmful, negative interpersonal trust can develop. For example, under normal circumstances people may not be afraid of others, but when violent conflict ensues, the fear of death as a result of potentially running into the wrong person alters the way in which people interact in this new context. Additionally, when people spread rumors or provide false information, negative interpersonal trust can develop. What we found was that in

the cases where negative interpersonal trust had developed, people engaged in new IT-enabled activities. In Iraq, people connected with kin in order to validate and cross-check information, seek travel information, and maintain social practices. These examples, again, show that people can go online to re-establish trust, further exhibiting the Internet's potential in allowing people to maintain trust when the degradation of trust is present in society.

Implications

Trust in information, people, and institutions is critical during disruption. As designers of technology, we must not assume that trust remains the same in a new, critical context. The interactions between people and institutions may change for better or worse, and we must keep this in mind. One common theme we found was that when either impersonal or interpersonal trust declined, people often sought help from people they trusted by utilizing various IT, e.g. mobile phones, online forums, and Social Networking Sites (SNSs). We will now better illustrate how designers can design technologies for people who experience such situations.

Recommender Systems

In everyday life, we often rely on recommendations from other people through word-of-mouth. People often make decisions based on other people's recommendations when they do not have personal experience to make a good decision, and trusting the recommendations made by others can be crucial (O'Donovan and Smith, 2005). The case studies we used illustrated that people have used IT to maintain trusted kinship network connections, and have received recommendations that have helped them obtain trustworthy information, as well as validate information sources. Today, research has been conducted in the domain of recommender systems (Goldbeck and Hendler, 2006) that may provide a way in which we can begin to better understand how technology can help establish trust in people's everyday lives. These systems often leverage social network data in order to provide recommendations. For example, people who are members of certain websites that employ recommender system algorithms, often collect data from an individual's social network. In aggregating such data, the system then makes recommendations, because people typically trust recommendations from people that they know (O'Donovan and Smith, 2005). In this case, these systems can be modified to recommend trustworthy people, e.g. friends of friends and friends of family, as well as trustworthy information sources, that those experiencing disruption can then rely on. The power of such systems is commendable and should be explored further in this context.

Connecting with Kin and Context Aware Recommendation

With the current proliferation of mobile technologies, and mobile-enabled Social Networking Sites (SNSs), people living through various disruptions can now connect to one another from virtually anywhere, as people are no longer confined to using the Internet from their homes. This is important when considering that people may be on the move, as homes may be flooded or damaged by bombs, of course, depending on the type of disruption.

SNSs, as defined by boyd and Ellison (Boyd and Ellison, 2007), are:

...web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a common connection, and (3) view and traverse their list of connections and those made by others within the system.

What makes these sites unique is that people can make their social networks visible to others. Thus, people can make connections that they otherwise would not have made by traversing other people's networks, though a search function is also available that people can use to search for friends, family, and even strangers (Boyd and Ellison, 2007).

SNSs, e.g. MySpace, are important in the context of a disrupted environment in allowing people to re-connect with members of their kinship networks to seek support. When a disruption takes place, family and friends may be separated, and as such, websites such as Facebook allow people to connect with one another to check-up, or to seek assistance. SNSs, however, also have another utility.

In building upon recommender systems, we also suggest that context aware recommendations should be explored. Facebook, one of the more popular SNSs, recently added what is called the "People you may know" tool. Here, Facebook was designed to automatically make recommendations to you of people you may know, depending on how many people within your social network also know that person. You can even see which of your friends know that person as well. Here, we suggest that this tool be made more contextually aware for those who are experiencing disruption. Rather than only recommending people based on your existing social network, as the contacts recommended made may not be located nearby, the algorithm should include a metric

that takes context into account, where in this case context may be based on location. That way, in the event of a disruption, SNSs such as Facebook can make recommendations based on trusted social network contacts of people who may be able to provide assistance, e.g. supplies and information.

CONCLUSION

Our goal in this research was to highlight the relationship between trust and context in an effort to provide recommendations for the design of new technologies for people who are experiencing disruption, e.g. war and disaster. Amidst what civilians in the various case studies were experiencing, people were able to leverage IT in order to maintain trust (i.e. by connecting with kin, or seeking help from strangers). Although the physical place was no longer safe, technology provided people with the ability to transcend the mistrust. As technologies continue to become available globally, their utility during both normal situations and disruption will continue to increase, and it is imperative that we design technologies catered to people who live in this very dynamic, unpredictable context.

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