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The social preferences of local citizens and spontaneous volunteerism during disaster relief operations

Abstract

Existing studies on disaster relief operations (DRO) pay limited attention to acts of spontaneous volunteerism by local citizens in the aftermath of disasters. The purpose of this paper is to explore how social preferences motivate citizens to help during post-disaster situations; above and beyond their own self-regarding interests. The paper begins by synthesizing the literature on social preferences from the field of behavioral economics and social psychology with the discourse surrounding behavioral operations management and humanitarian operations management (HOM). By doing so, we identify the motivators, enablers and barriers of local citizen response during disaster relief operations. These factors inform a theoretical framework of the social preferences motivating spontaneous volunteerism in post-disaster situations. We evidence facets of the framework using archival and unstructured data retrieved from Twitter feeds generated by local citizens during the floods that hit Chennai, India in 2015. Our model highlights the importance of individual level action during disaster relief operations and the enabling role of social media as a coordination mechanism for such efforts.

Keywords: Social preferences, spontaneous volunteerism, disaster relief operations, social media, behavioral operations management.

1. Introduction

The impact of natural disasters on local communities and people's livelihoods can be severe, prompting much scholarly interest from the fields of disaster relief operations (DRO) and humanitarian operations management (HOM) (see Kovacs and Spens, 2007; Jabbour et al., 2017). Scholars studying disaster response tend to examine how government agencies, private companies, and non-governmental organizations (NGOs) conduct and co-ordinate relief efforts (Holguín-Veras et al., 2012; Naor et al., 2017). Yet, one important stakeholder group is often overlooked; the citizens living in affected communities (Whittaker, et al., 2015). Examples abound of local people helping victims of disasters through spontaneous acts of unconditional kindness. Such spontaneous volunteerism is often guided by altruism, fairness and reciprocity; behaviors that comprise the social preferences of the helping individual (Charness and Rabin, 2002; Levitt and List, 2007, Dhami, 2016). A case in point is the overwhelming help provided by local citizens to victims of the 2004 Sri Lankan tsunami, especially given the time it took government agencies and NGOs to reach affected areas (Ivarsson, 2015).

Despite the significant role played by local citizens, the extant HOM/DRO literature pays limited attention to the social preferences that motivate individuals to spontaneously help victims in the aftermath of disasters (Sawada and Oum, 2015). This is particularly true of conceptual frameworks and theoretical modelling focused on humanitarian response and operational relief to post-disaster beneficiaries. Studies in this line of inquiry have made great strides in designing conceptual frameworks which determine the most effective and efficient supply chain response for companies and aid agencies during disaster relief operations (Balcik et al. 2010; Chakravarty, 2011; Coles et al., 2012; Day et al., 2012; Falasca and Zobel, 2012; Holguín-Veras et al., 2013; Kumar and Havey, 2013; Manopiniwes and Irohara, 2017). Yet, the primary unit of analysis employed by these HOM/DRO studies tends to be the organization, with an emphasis on companies, governmental agencies and NGOs (Balcik et al., 2010; Starr and Van Wassenhove, 2014).

As such, these studies fail to incorporate the pro-social behavior and spontaneous volunteerism of individuals in the modelling exercise, be it within optimization models or conceptual frameworks. Specifically, when modelling the optimization behavior of stakeholders during post-disaster relief operations, the pro-social optimizing behavior of locals is missing. Moreover, when building conceptual models that account for humanitarian actors, the spontaneous volunteerism of local citizens is missing. Such omissions are important as the altruistic orientation

of people is said to become amplified during disaster relief situations as individuals put their self-interests aside and spontaneously volunteer to help others in need (Bierhoff, 2002; Lowe and Fothergill, 2006; McLennan et al., 2016). We argue that studies on humanitarian operations, especially of relief support to beneficiaries, are incomplete without a consideration of the social preferences that motivate local citizens to spontaneously volunteer during post-disaster situations.

To build this argument, we draw upon scholarly works from the fields of behavioral operations management, behavioral economics and social psychology; disciplines in which scholars have long suggested that pro-social behavior is pervasive among individuals (i.e. Bierhoff, 2002; Charness and Rabin, 2002; Dovidio et al., 2006; Just, 2014; Loch and Wu, 2007). Social psychology scholars, for example, suggest that social preferences can take the form of altruism, kindness, fairness, trust and reciprocity (Just, 2014). In turn, behavioral operations management scholars argue that socio-psychological elements, such as empathy and social cohesion, play a salient role in explaining an individual's behavior during naturally occurring crises (Loch and Wu, 2007).

With a focus on conceptualizing, this paper synthesizes these literatures to develop a theoretical framework of the motivators, enablers and barriers of spontaneous volunteerism in the aftermath of disasters. Our framework is informed by archival and unstructured data retrieved from Twitter feeds posted by individuals during the 2015 floods in Chennai, India. We selected this event due to the heightened levels of involvement from local citizens in the immediate aftermath of the disaster. Local citizens extensively used social media to coordinate and distribute relief materials for several weeks following the event, providing a rich pool of data to draw from. The Chennai floods illustrative example helps to contextualize how social preferences can be transformed into action during a post-disaster relief situation.

By bridging the behavioral economics and social psychology literature, this paper contributes to the emerging field of behavioral operations management and in turn behavioral human operations (Croson et al., 2013; Loch and Wu, 2007). At the same time, the paper answers the call to enrich the behavioral operations management discipline by drawing from other fields (Aker and Wamba, 2015; Eftekhar et al., 2017; Taylor and Taylor, 2009). Moreover, our study fills an important gap brought to light by Gupta et al. (2016) who suggested a need for more research using field and archival data to better understand post-disaster relief operations. The use of Twitter feeds presents an alternative empirical method that can enrich our understanding of disaster relief scenarios. Our study contributes to managerial thinking by providing instruction to practitioners

in the HOM/DRO fields on how to harness volunteers' pro-social behavior during post-disaster situations.

The remainder of the paper is organized as follows. Section 2 reviews the extant literature on humanitarian and disaster relief operations, social preferences and spontaneous volunteerism to create a theoretical framework. Section 3 presents the 2015 Chennai floods as an illustrative example of social preferences and spontaneous volunteerism in actual disaster relief situations. Then, section 4 synthesizes the extant literature with evidence from the Chennai floods case to develop a conceptual model of individual-level spontaneous volunteerism in disaster relief operations. The final section outlines the paper's theoretical and managerial contributions.

2. Literature Review

2.1. Humanitarian and disaster relief operations

Humanitarian and disaster relief operations management relate to the effective 'planning, implementation and controlling' of the flow of goods and materials to post-disaster beneficiaries (Day et al., 2012). HOM/DRO can also be seen as a supply chain system which evaluates, integrates and coordinates the activities of humanitarian actors and stakeholders both pre- and post-disaster (Day et al., 2012). Some HOM/DRO scholars focus on how the supply chain and in-country operational activities can deliver an effective and efficient humanitarian response (see Altay and Green III, 2006; Balcik et al. 2010; Bealt et al. 2016; Jabbour et al. 2017; Rodríguez-Espíndola, 2017).

The importance of individuals and their social networks during disaster relief situations is highlighted by a variety of HOM/DRO scholars (Altay and Green III, 2006; Galindo and Bhatta, 2013; Holguín-Veras et al. 2013; Kovacs and Spens, 2009; Bealt et al. 2016). A question addressed by these scholars is how to determine the optimal organizational and network structure that best facilitates communication and coordination immediately following a natural disaster (Altay and Green III, 2006; Galindo and Bhatta, 2013). These scholars argue that because disaster relief operations involve social and political actions, modelling social behavior is necessary to understand how to mount an effective response (ibid). Holguín-Veras et al. (2013) in their contrast of commercial and humanitarian logistics stress how the social network of individuals helps to mobilize an effective logistical response to natural disasters. Kovacs and Spens (2009) argue that the key to the coordination of logistics activities is having a local presence of humanitarian logisticians that understand the native community and landscape. A more recent study by Bealt et

al. (2016) identified ways in which individuals working in humanitarian organizations collaborate with logistics service providers to deliver a coordinated response.

A common theme running throughout these studies is the need for a social network of individuals to coordinate technical activities such as transportation and communication in the aftermath of a disaster. Interestingly however, the individuals discussed in these studies are employees of organizations. What is missing from the extant literature is an account of how and why individual citizens living in affected communities spontaneously volunteer to help when disaster strikes. Such an omission is surprising as ordinary citizens are usually first on the scene in a disaster and remain long after official services have ceased (Whittaker, et al., 2015, p.359). Oftentimes, citizens living in affected areas are self-deploying and converge in damage hit areas as first responders, with or without invitation (Lowe and Fothergill, 2003; Waugh Jr. and Streib, 2006). Clearly, the post-disaster relief efforts of individual citizens cannot be ignored and there is a need to better understand their participatory role in disaster relief operations. Luckily, the fields of behavioral economics and social psychology provide insights on what motivates individual level responses in post-disaster situations. We turn to this literature next.

2.2. Social preferences and spontaneous volunteerism

Social preferences are termed ‘other-regarding’ preferences as they take into consideration the actions and well-being of others (Just, 2014, p. 389). While self-regarding preferences can be identified when individuals derive satisfaction solely from their own pecuniary or non-pecuniary payoffs, other-regarding preferences are when individuals care for others on moral grounds, wishing to signal desirable human qualities such as altruism or unconditional kindness (Dhami, 2016). Social psychologists broadly define such pro-social behaviors as interpersonal actions that benefit other people in society other than one-self (Dovidio, et al., 2006, p. 21). More precisely, pro-social behavior can be defined as an action to improve the situation of the beneficiary (recipient) and where the actor (source) is not motivated by any professional obligation and the recipient is not an organization, but an individual (Bierhoff, 2002, p. 9).

Individuals have been found to care about the well-being of others in a variety of ways including altruism, kindness, fairness, trust and reciprocity. *Altruism* is a type of social preference where an individual’s well-being increases with another individual’s well-being through unconditional kindness (Dhami, 2016, p. 341). Thus, an altruistic behavior is a desire to benefit another person without anticipating rewards/benefits for oneself from such action (Dovidio et al.,

2006, p.25). *Kindness* refers to a positive action in favor of someone and is thus unconditional if there are no expectations of any kindness in return (Dhimi, 2016, p. 341; Just, 2014). Individuals may also have a concern for *fairness* for others and act to reduce any unfairness and inequity they perceive others may face (Dhimi, p. 342; Just, 2014). Thus, fairness can become an act of kindness when others are perceived as being hard done by.

Reciprocity is an in-kind act in response to the actions of others (Just, p. 488). As a 'return the favor' principle it means a person would respond to kindness with kindness and unkindness with unkindness, sometimes 'even in the absence of long-term gains and under complete certainty', which implies intrinsic reciprocity (Dhimi, p. 342). With respect to an emergency or disaster situation, *indirect* reciprocity is likely to matter more as it does not involve reciprocal behavior between two individuals only but kindness towards someone who has been kind towards others, or has a reputation of doing so (Rawls and David, 2006). Related to reciprocity is *trust*, which is a 'person's willingness to place others in a position to make decisions that could either help or harm the person' (Just, 2014 p. 492). Pro-social behavior may arise due to the trustworthiness between/among people, where the well-being of all-parties increases in turn (ibid).

Spontaneous volunteerism is a spontaneous act to help others motivated by the social preferences of individuals and can be seen as a broader manifestation of pro-social behavior (Bierhoff, 2002). Spontaneous' volunteers are those people who offer assistance of help on an impulse, following a disaster and who are unlikely to be associated with volunteer agencies and may not possess specific training or experience (Cottrell, 2010). A key distinction between non-spontaneous and spontaneous volunteers, is the former group have time to decide whether to help and how. They also pursue, rather than react to, an opportunity to volunteer and often for an extended period of time, as exemplified by volunteer work (Clary et al., 1998). Spontaneous volunteers, on the hand, immediately react to a situation as it arises and offer help.

2.3. *Motivators of Disaster Relief Operations*

Social preferences are determined by several socio-psychological factors we call *motivators*. For the purposes of this paper, *motivators* are defined as motivating factors that drive pro-social spontaneous volunteer behavior for post-disaster relief operations. One key motivator of pro-social volunteering is the *empathy* a person has towards another person (usually a disaster victim). Empathy can be defined as 'understanding another person's thoughts and feelings by putting oneself in the other's position' (Bierhoff, 2002, p. 107). Batson (1991) embraces an empathy-

altruism hypothesis where he contends that an empathic concern, such as a person's emotional response of sympathy and compassion towards the welfare of another person, may lead to altruistic volunteerism. Empathic emotions can thus explain pro-social actions. Still pure altruism aside, emotional arousal such as negative feelings of guilt and sadness could also induce concern for others driven by one's own distress (Batson, 1991, 2002). An example is the plight of disaster victims which causes anguish and sorrow. Therefore, some disaster relief volunteerism could arise as an attempt to reduce/minimize negative feelings (Dovidio et al., 2006, p. 131).

Social and personal norms are rules and standards of accepted appropriate behavior and a person's expressed feelings to behave in a certain manner (Dovidio et al., 2006, p. 110). People can use such personal or social standards to guide their actions (Dovidio et al. 2006). Two norms that can lead to pro-social behavior and spontaneous volunteerism are *inequity aversion* and *social responsibility* (ibid). An individual is said to be inequity averse if, in addition to his material self-interest, his utility increases if the allocation of material payoffs becomes more equitable (Fehr and Schmidt, 2006, p. 620). Thus, during an emergency or disaster, individuals would value relief efforts if resources were equitably allocated among others. As people feel worse off by seeing others who are less fortunate, some individuals may be motivated to engage in pro-social activities to improve their own well-being and restore equity, through acts such as volunteerism (Dovidio et al., p. 113). Very often volunteers act out of concerns when they perceive disaster relief victims being unfairly and unjustly affected, prompting them to act to alleviate such unfairness and injustice.

Social responsibility implies concern for the welfare of others with a sense of relatedness with the person in need (Bierhoff, 2002, p. 162). It means being concerned for someone and something, normally in relation to an occurrence/instance, like a disaster (ibid). Thus, people who are socially responsible are expected to help those disaster victims who are in need. Such social norms of 'otherness' can explain why people are more likely to help during disaster relief operations.

Apart from norms, values can play a key role in prompting pro-social volunteerism. Values relate to desired 'virtuous' goals where individuals strive toward being 'exemplary' citizens (Musick and Wilson, 2007). Voluntary behavior geared to achieving these desired goals is termed value-oriented volunteerism which can be motivated by a sense of moral obligation and duty (Batson, 2002). Indeed, volunteering is often motivated by an appeal to moral principles, such as, doing what is right or a feeling of what should be done (ibid). In such cases people feel they should

not ‘free ride’ but do their fair share. It can thus be argued that value-oriented motivated morality will guide the voluntary actions of people during relief efforts.

A final potential motivator for pro-social disaster relief volunteering is termed learned helpfulness. As much as we learn to be selfish we can ‘learn to be helpful’ (Dovidio et al., 2006, p. 110). It is possible that people are motivated to volunteer if ‘they have been positively reinforced for helping in the past’ (p. 108), normally through direct experience and when they have socially learned about helping through observing others (ibid).

Synthesizing the extant literature from the fields of behavioral economics, social psychology and HOM/DRO, we now advance a theoretical framework of the motivators and social preferences of individual-level response to disaster relief situations (See Figure 1).

**** FIGURE 1 ABOUT HERE ****

3. Research methodology

The theoretical model presented in Figure 1 is now applied to an actual disaster event, that of the 2015 floods in Chennai India. This illustrative example is used to interrogate the validity of the theoretical framework and, in doing so, to lead to a more robust conceptual model of individual-level spontaneous volunteerism during disaster relief situations.

3.1. Illustrative example - The 2015 Chennai floods

In 2015, Chennai a metropolitan city in south India, was subjected to a record level of rainfall which inundated most of the low lying areas of the city (Jameson and Baud, 2016). During the disaster, relief efforts were coordinated by local youths using social media, including Twitter and Facebook. We found social media to be a pivotal platform for the sharing of information regarding the availability of food and drinking water, shelter to occupy, locations of medical facilities, rain forecasts, medication for common illness, dealing with drowned vehicles and instructions for public safety to avert communicable diseases. Social media was also used to circulate the details of missing persons to the public and proved essential in reuniting individuals with their families. Therefore, to better understand the social preferences of these individuals and their spontaneous volunteerism, we gathered Twitter feeds generated after the Chennai floods using the following hashtags: #ChennaiFloods2015, #ChennaiRainsHelp #ChennaiFloods #ChennaiRains, #PrayforChennai.

We collected 4588 tweets for the period 01/12/2015 to 30/04/2016. Content analysis techniques were used to analyze the data (Krippendorff, 2012). We manually scanned Twitter feeds and secondary data to identify passages of text that relate to the motivators, enablers, and barriers of social preferences and spontaneous volunteerism during DRO. This process resulted in 175 useful tweets covering motivators (118), barriers (42), social preferences/spontaneous volunteerism (15), in the context of DRO. The appearance of tweets during and after the event was substantial in the range of 746 to 926 during 01/12/2015 and later decreased to around 11 tweets during 01/04/2016 to 30/04/2016.

To triangulate the findings (Yin, 2014), we also gathered archival data by searching the internet, videos, blogs and newspaper articles for mentions of the Chennai floods. This acted as supplementary information for tweet data and coded accordingly. The following sub-section documents our findings.

3.2. Findings

In what follows, we organize the discussion around the social preference types identified in the literature review and relate these to motivators, noting that some motivators cut across types of social preferences. Table 1 shows the archival information, mostly tweet feeds, as coded text and the corresponding social preference types and likely motivators.

**** TABLE 1 ABOUT HERE ****

Altruism and kindness. Table 1 presents several cases that depict an act of altruism and kindness. One of the interesting incidents shared on social media related to the sharing of food packets between children in need (see text # 1 in Table 1). The relief team gave the food packet to one boy, but the boy who received it handed the food packet over to another child. The act of giving the food to the other child, even when he himself was hungry, demonstrates altruistic behavior on the part of the giving child.

We also found evidence from social media of individuals working in professional occupations giving up their time and livelihoods to help victims of the flood. For several days and weeks following the floods, fishermen used their boats to save victims from the water; even though doing so meant foregoing wages. Similarly, prepaid scooter or auto rickshaw drivers offered free trips to people in need, while private bus operators offered free services to major cities within the

state so that affected people could travel to live with relatives while their homes were repaired, giving up potential revenue. A doctor offered help for all medical emergencies in the cities directly affected by the flood, free of charge (see text # 2 in Table 1). These acts of high cooperation were kind and altruistic in nature as they were provided freely, sometimes at a significant cost to the individual giver.

The motivators of such actions are likely related to empathic concern, sympathy and compassion as well as feelings of sadness and guilt, feelings which often provoke individuals to lend a helping hand (Dovidio et al., 2006, p. 108). Sympathy is the awareness of suffering of others, while empathy is an attempt to comprehend and understand experience and feelings of another person (Bierhoff, 2002, p. 108). Both sympathy and empathy are likely to raise awareness and compassion in an individual in an emergency and disaster, therefore acting as a cue to altruistically help out. Other emotions, such as sadness and guilt, might also arise during a disaster and lead to spontaneous pro-social altruistic behavior (Bierhoff, p. 152).

Fairness. Table 1 depicts incidents of the increased sacrifice of stakeholders to ensure fairness. While the incident of a boy giving away a food packet can be seen as an act of altruism, it also shows strong evidence of distributive fairness (see text # 1). That is, during distribution of food packets between boys, one child [actor] thought of the less fortunate child [other person] and was motivated to avoid outcomes in which the other child received nothing [lower payouts] (Just, 2014, p. 483). Such actions are likely motivated by feelings of *inequity* towards another in the group (Dhmi, 2016, p. 342).

Other examples of distributive justice include individuals and/or organizations giving up something, such as their income/livelihoods, especially if others are less fortunate than themselves (see Table 1). Table 1 provides examples of a government official from Bihar province who donated one month's salary to the flood relief fund, two individuals offering a place to stay to those without a home, and of numerous celebrities giving their time and money to help organize the distribution of relief materials to victims in need and bringing significant media attention to the cause (see texts # 3, 4, 5, and 14 in Table 1). These examples demonstrate a concern for others who are less fortunate than oneself. An aversion to perceived inequity and injustice could explain such pro-social behavior of volunteering money and time.

Another motivating factor of fairness is *learned helpfulness*. People in general learn to be helpful. They learn as children that pro-social behavior, such as fairness, is desirable and thus what

actions that define a responsible citizen, recognizing good deeds are expected of them (Bierhoff, 2002, p. 152). Experiencing such past events and learning to be helpful as a result, generates pro-social citizens as a result. In fact, the example of Muttiah Muralitharan helping out is not surprising because as a Sri Lankan he witnessed the horrors of the 2004 Tsunami that had a devastating effect on his home country (see text # 4 in Table 1). Having volunteered then, it would have been natural for him to help again having learned from a previous disaster.

Trust and reciprocity. Examples of trust were apparent during the flood event as we found instances of trusting and reciprocal relationships in the actions of people from different faiths, in a country deeply divided along religious lines (see Table 1). Indeed, during the data analysis process several examples surfaced of individuals breaking religious, socio-economic and political barriers to help the worst affected people to bring normalcy to the flood hit areas. For example, Muslims were found to have received shelter in Hindu temples while various mosques and Muslim convention centers were opened for the needy public to stay (see text # 15 in Table 1). Various Muslim organizations prepared food continuously at various places throughout the city and posted the information regarding availability on social forums such as Twitter and Facebook. One incident that was shared repeatedly on social media was that of a Muslim man who rescued a pregnant woman and helped deliver the baby. To honor the rescuer, the family named the baby after him despite the family being from a different religious group.

These pro-social acts depict both trust and reciprocity. Table 1 provides examples of tweets of where individuals had trust in someone from another faith or toward strangers when offers were made of allowing others to stay in one's home free of charge (see texts # 5 and 14). In addition, there were cases of people offering reciprocal act of kindness to other individuals, cases which crossed religious divides (see texts # 6, 11 and 15). Reciprocal behavior was also evidenced after calls for help, where transportation became a priority (see texts # 6 and 11). These instances evidence both intrinsic and indirect reciprocity.

Some acts appeared to be motivated by high degrees of *social cohesion* and *solidarity*, *social responsibility* and possibly *moral obligation*. Evidence of social cohesion and solidarity was found in the case of people forming a human chain to save a drowning man in flood water (see text # 12). These motivators highlight cognitive thoughts that individuals in society should cooperate in situations of need and show solidarity towards each other; exhibiting a responsibility to society and fellow individuals irrespective of religious divides.

3.3 Barriers to Individual Level Response

So far we have outlined the motivators behind spontaneous pro-social volunteerism during the Chennai floods. However, we also found evidence of certain actions that hampered such volunteerism. A primary barrier found to obstruct the ability of individuals to provide help was ineffective local and national government coordination.

When analyzing the data, it emerged that a major complaint by individuals following the disaster was poor city planning and improper maintenance of water bodies on the part of the local and national government. Prior to the disaster, the government approved the construction of a number of residential buildings and development, some illegal and unplanned (Ravishankar, 2015). When the flood hit, these buildings disturbed the naturally occurring water pathways and caused overflow into surrounding areas. Indeed, there were encroachments in the form of concrete structures which directly affected the water flow across rivers and canals, such as the Cooum River and Buckingham Canal; waterways that serve as the main water drain for the city. Despite calls to act and resolve this issue, the lack of coordination across governmental departments, led to an impasse such that this issue failed to be resolved before the flood hit (Pereira, 2015).

Evidence of ineffective coordination became apparent when instead of banding together and cooperating, as ordinary citizens did during such calamity, local politicians decided to play politics. For instance, the ruling political party attempted to take advantage of the disaster relief efforts by printing pictures of the Chief Minister on the front page of leading daily newspapers standing with donated items, and in some cases having her portrait printed on relief materials, despite the fact that all of the relief material were donated by local volunteers and non-governmental organizations. Moreover, instead of joining the relief effort, opposition parties started pointing fingers at the current local government and Chief Ministers for inadequate measures to prevent the flooding. Such a state of affairs created a deep distrust in politicians and governmental organizations following the event (Ravishankar, 2015).

Moreover, we found examples of people complaining on Twitter that the emergency phone line provided by the state government was left unattended when people attempted to make contact. A city-wide power outage continued for four days following the disaster and many people suffered from water-borne diseases because of contaminated drinking water. The mismanagement of the relief fund by the state government also triggered negative responses from people across the Twitter feeds. It emerged from the tweets that the government was perceived by individuals as

generally ineffective whereas volunteers were praised repeatedly for helping the victims of the calamity.

4. Conceptual Model

Drawing on the extant literature and the findings of the Chennai case, we now present a conceptual model which depicts the motivators, enablers and barriers of individual-level spontaneous volunteerism during post-disaster situations. Like the theoretical framework (see Figure 1), our conceptual model has humanitarian and disaster relief operations as its key outcome. Our model suggest that this outcome is determined directly by spontaneous volunteerism which itself is a manifestation of ordinary citizens' social preferences.

In line with the extant literature, we found that pro-social behaviors exhibited in the Chennai flood include: *altruism, kindness, fairness, trust* and *reciprocity*. We found that social preferences were shaped by a number of motivators including: empathy and compassion, feelings, norms of inequity aversion and social responsibility, solidarity and social cohesion, moral obligation and duty as well as learned helpfulness. Based on the literature and the case data we argue there is a positive association running from motivators to social preferences, social preferences to spontaneous volunteerism, and spontaneous volunteerism to DRO.

4.1 Motivated social preferences for relief volunteerism

Several of the motivators discussed in the literature review section were found to act together or independently to promote spontaneous pro-social volunteerism during relief operations. Altruism and kindness were found to be primarily guided by empathetic concern of 'other-oriented emotional response' of sympathy and compassion. The norm of social responsibility and value of morality were found to be motivated by concerns of 'otherness', or being part of a larger group of community. In addition, learning and developing kind-hearted and altruistic traits were found to stimulate pro-social relief volunteering. Fairness, on the other hand, is most likely promoted by perceived inequity aversion and injustice, although in some cases, moral principles can push individuals to avoid free riding and develop a sense of fairness. Thus, the drive to achieve equity, justice and to do what is morally right may motivate 'fair' voluntary participation in relief support.

Trust and reciprocity were more readily found in the presence of socially responsible citizens and people with a great sense of solidarity and social cohesion. The Chennai floods example showed how group solidarity spurs spontaneous volunteerism. Celebrities were found to act in

solidarity with every day citizens by donating time and money, and, in turn prompted others to do likewise. We therefore suggest that solidarity is a key factor that creates social cohesion among groups of people in society (Reicher and Haslam, 2009).

Our findings provide support for Batson's (1991) assertion that spontaneous volunteerism may be driven by empathy, sympathy and compassion. Batson (2002) states individuals can be collectively motivated to volunteer so as to raise the welfare of a group. This means group solidarity and social cohesion can promote pro-sociality and consequentially impulsive relief volunteerism. With such volunteerism people are less likely to volunteer on the basis of *in-group* identity; instead social cohesion manifests itself across religious divides, as was seen during the Chennai floods. We found evidence from the tweets of social cohesion where people from all faiths were welcome to shelter in churches, temples and mosques.

Based on these findings, we argue that a citizen's response to disaster situations is motivated in the first instance by high degrees of empathy (and sympathy) aroused by emotional feelings of guilt and sadness. Secondly, an individual's response is prompted by adherence to social and personal norms of equity and social responsibility, high solidarity and social cohesion, an acute sense of moral obligation and duty, and having gained a learned understanding.

4.2 Enablers of spontaneous volunteerism

In addition to motivators, the case findings highlighted two key enablers that played a positive reinforcing role between spontaneous volunteerism and disaster relief operations. Enablers are the facilitating factors that reinforce the social preferences/spontaneous volunteerism relationship with humanitarian relief operations. The key enablers that we identified from the case include *social media* and *decentralized decision making*.

Social media is a mode of communication which enables people to disseminate and receive information (Chan et al., 2017). A study by Kaigo (2012) reported the usage of social media for disseminating vital information during the 2011 great east Japan earthquake, while Starbird and Palen (2011) highlight the role of 'digital volunteers' in self-organizing in the aftermath of the 2010 Haitian earthquake. Social media is an important source of information and communication that can be utilized during DRO. But perhaps more importantly social media can also act as a social bonding mechanism that leads to an emergent type of volunteering called 'digital volunteerism' (Hofer and Aubert, 2013; Whittaker et al., 2015; Akter and Wamba, 2017). The Chennai floods

provided examples of digital volunteerism where high profile celebrities used Twitter and Facebook to encourage local citizens to participate in relief efforts.

Scholars such as Wamba et al. (2017) have contended that social media can change people's behavior and possibly their pro-sociality. Summarizing the discourse surrounding social media in emergency situations, Simon et al. (2015) point out that social media can serve 'as an integral and significant component of crisis response' (p. 609), becoming critical for disaster relief agencies and organizations both for disseminating and accessing information to and from the public. Thus, social media allows citizens to engage in emergency management. Our study of the Chennai floods supports these findings. Twitter, Facebook and other social media sites were the primary coordination platforms used by local volunteers. In fact, without these social media platforms volunteers would have struggled to coordinate relief efforts as the resources and infrastructure available to government agencies and NGO's was not available to ordinary citizens. Drawing together the literature and case findings we therefore suggest a positive enabling role for social media in promoting spontaneous volunteerism in humanitarian relief situations.

The second important enabling factor identified from the case is *decentralized decision making*. Local actors, be they individuals or organizations, can play a crucial role reaching beneficiaries given their proximity and specific localized knowledge of affected areas (Wang et al., 2016). Wang et al. (2016) used Hurricane Katrina as an example to show that private firms were far more effective and responsive than centralized government agencies during relief operations precisely because of decentralized structures and possessing knowledge of local conditions. This is because 'locals' are privy to community-centric information not available to centralized agencies.

The Chennai floods demonstrated how the mismanagement of the disaster by India's central government existed in stark contrast to the relief efforts of some local organizations. For example, local bank branches in the city were opened during holidays for the benefit of affected people to transact and withdraw money. The local passport offices organized special camps to replace damaged or lost passports free of charge. Hence, we suggest that decentralized decision making plays an enabling role in disaster relief efforts.

4.3 Barriers to spontaneous volunteerism

In addition to enablers, the findings brought to the fore two key *barriers* that impeded spontaneous volunteerism in disaster relief situations: *ineffective coordination* and *high risk exposure*. *Ineffective coordination* can be seen as the issues and problems that prevent the effective ‘relationships and interactions among different [humanitarian] actors operating within the relief environment’ (Kabra et al., 2015, p. 129). As a broad issue, ineffective coordination includes strategic, technological, cultural, individual, and organizational sub-barriers (ibid). The first of these sub-barriers, comprises a lack of collaborative planning and commitment to enhance coordination. Such an issue often arises due to a lack of leadership and guidance from national authorities. The ineffective response by the Office of Emergency Management (OEM) of the US Department of State during the 9/11 Terrorist Attacks and the Federal Emergency Management Agency (FEMA) during Hurricane Katrina are well documented examples (Wang et al., 2016; Waugh Jr. and Streib, 2006). The Chennai floods provide a further example of government representatives not manning emergency phone lines and of state run infrastructure crumbling in the wake of the flood leading to lengthy power outages and contaminated drinking water. Other sub-barriers include a lack of willingness and time for information/knowledge sharing, poor communications, lack of trust among humanitarian actors, and lack of motivation. Barriers such as these can give rise to ineffective coordination and act as severe constraints for assimilating spontaneous volunteers within a humanitarian supply chain management system.

Another important constraining factor is *risk exposure*. The literature documents that risk exposure may have a dampening effect on social preferences (Ivanov, 2017; Gangadharan and Nemes, 2009; Jahre 2017). Though natural disasters are generally expected to promote pro-sociality (Cassar et al., 2017), emergency situations can also have a countervailing effect (Gangadharan and Nemes, 2009). The behavioral economics perspective argues that though people may be accustomed to facing some risk and strategic uncertainty, an increase in disaster risk raises environmental uncertainty leading to a reduction in cooperation (e.g. contribution to public goods) and an increase in private investment instead (Wang et al., 2016; Gangadharan and Nemes, 2009). The reasoning behind this point is the importance of saving first to recover from likely private losses before contributing to the public good (i.e. helping), where the increase in private investment acts as an insurance against the disaster risk. Politicians reacting to the Chennai floods by putting blame on other political parties provided a telling example of self-preservation by individuals looking to survive the crisis – possibly at the expense of other people. We therefore expect *risk*

exposure to act as a barrier to spontaneous volunteerism. Our conceptual model of spontaneous volunteerism during disaster relief operations is presented in Figure 2.

**** FIGURE 2 ABOUT HERE ****

4.4 The organizational context.

So far we have presented a conceptual framework informed by case evidence where spontaneous volunteerism leads to DRO. Next, we provide context to social preferences/spontaneous volunteerism within an organizational relief supply chain. To do so, we consider the role of spontaneous volunteerism within a disaster relief operation (see Figure 3).

**** FIGURE 3 ABOUT HERE ****

Figure 3 presents a ‘partial’ organizational supply chain for DRO. The humanitarian/disaster relief supply chain is taken from Balcik et al. (2010) and Coles et al. (2012) and augmented by the inclusion of spontaneous volunteers’ social preferences in a supporting role.

The Balcik et al (2010) and Coles et al. (2012) frameworks show the typical flow of supplies/resources in a relief supply chain during an emergency and disaster. Here, we focus on post-disaster operations eschewing the pre-disaster side of their framework (hence the ‘partial’). We argue that spontaneous volunteerism is harnessed at the local stage of the humanitarian relief supply chain. Immediately following a disaster, local citizens would be first on the scene and could help to connect local distribution points with beneficiaries (Whittaker et al., 2015). Volunteers are likely to possess localized knowledge and will be privy to information unavailable to non-locals and centralized emergency agencies. To harness the potential of spontaneous volunteerism, governments and NGOs could provide local volunteers with relief materials and information which they can in turn disseminate. In addition, local volunteers often possess their own resources which can be shared to support the relief effort. The example of volunteers locally coordinating the use of personal automobiles during the Chennai floods is a case in point.

Thus, we argue that spontaneous volunteers play a positive supporting role in disseminating relief supplies to beneficiaries, to the extent that without their help supplies may fail to reach beneficiaries, with devastating outcomes. Local citizens are well positioned to offer operational support to smooth the flow of relief supplies to beneficiaries from local distribution points,

working alongside official agencies and volunteer organizations (see Figure 3). By using social media as an enabling mechanism, the sharing of resources could be coordinated virtually through platforms such as Facebook and Twitter, as illustrated by the Chennai floods case. Locally based ‘digital volunteers’ could prove vital, especially if such individuals assist with ‘on-the-ground’ observations and advice communicated via social media platforms (D’Cunha, 2015, Starbird and Palen, 2011; Whittaker et al., 2015).

5. Contributions

5.1 Theoretical contribution

This paper makes a theoretical contribution at the intersection of behavioral economics, social psychology, behavioral operations and HOM/DRO. To the best of our knowledge, this paper is the first to conceptualize the role of local citizens’ social preferences and spontaneous volunteerism in disaster relief operations. As opposed to the conventional use of modelling and experimental studies in the DRO/HOM literature, our study empirically examines the relationship between social preferences and disaster relief operations using archival and secondary data sources. Thus, this paper conceptualizes the supporting role of spontaneous volunteers in a humanitarian supply chain setting. We move away from the typical discourse surrounding governmental and NGO level responses to natural disasters and instead outline the motivators, enablers and barriers of individual-level actions.

In this paper, we have argued that particular social preferences stimulate spontaneous volunteerism. While some pro-social behavior is outside the control of policy-makers, others can be harnessed. Initiatives that promote inter-faith solidarity and social cohesion could be promoted through social and information exchanges to create understanding between people and religious communities. To avoid impediments to relief operations, relief efforts should recognize cultural sensitivity to enhance effective collaboration across religious, ethnic and gender divides. Perhaps the greatest tool is education. Learned helpfulness, moral obligation, social responsibility, compassion, empathy, and justice could be taught to children at an early stage, which would then develop into a strong sense of belonging and willingness to help. Findings from the case study have shown how social media and empowered decision making act as enabling forces of spontaneous helping during DRO, while ineffective organizational coordination and high risk exposure act as barriers.

5.2 Practical contribution

We expect our conceptual model to prove useful to governments, NGOs and private organizations by giving instruction on how to mobilize individual level action in the wake of emergencies and disasters. Practitioners will be able to harness such social preferences to elicit help from untrained but willing tech-savvy young volunteers. Moreover, we stress the importance of integrating individual spontaneous volunteerism in a volunteer management system (VMS) during relief operations (Fernandez et al., 2006). At the moment most volunteer management systems are comprised of government agencies, NGOs, and the private sector who attempt to coordinate efforts and deliver a unified service to beneficiaries (Whittaker et al., 2015). Two goals emerge from operational issues identified in this paper for an effective VMS. First, integration of the local individual humanitarian volunteers as stakeholders. Second, effective coordination among stakeholders (Kabra and Ramesh, 2015).

As highlighted earlier, there is often a ‘vacuum of authority’ during relief operations and an inevitable ‘convergence’ of spontaneous volunteers (Fernandez et al., 2006; Lowe and Fothergill, 2003; Delmonteil and Rancourt, 2017). Human nature is such that volunteers will inevitably converge invited or uninvited. Thus, a VMS should not impede spontaneous volunteers but must also ensure that volunteers do not impede governmental and NGO relief efforts. Therefore, the best approach is better integration of spontaneous local volunteers into national, regional and local disaster relief operations (Waugh Jr. and Streib, 2006).

To mitigate the coordination problems among humanitarian actors and to ensure the success of the spontaneity of volunteering for humanitarian operations, one could follow the suggestions of Kabra and Ramesh (2015). They document 15 solutions to overcome the barriers to effective coordination so that decision makers can realize the benefits of coordination in humanitarian supply chain management. Although their recommendations apply to coordination in general, some of these also apply to our context. For instance, feedback mechanism to learn from prior experiences could be used to enhance ‘learned helpfulness’. The two-fold solution of using IT and web-based systems is likely to promote ‘digital volunteerism’, and create an environment of ‘social cohesion’ and ‘mutual trust’.

As highlighted by the Chennai case, the VMS could rely more on digital volunteerism with online social media playing a key role, possibly adopting a digital VMS which stakeholders could use. For instance, a digital VMS could be based on ‘crowdsourcing data from several hundred online sources’ which is made available to stakeholders during the relief effort (Whittaker et al.,

2015). Interestingly, government agencies or NGOs do not necessarily have to invest money and time, as this free service would emerge through the joint effort of several digital volunteers sharing information online.

Furthermore, it is important to empower local volunteers, whether individuals or organizations, to enable them to make operational decisions in some cases. The legal and institutional structures could be changed to allow for these kind of volunteerism removing liability concerns of potential volunteers who wish to participate in relief effort but do not, out of fear of prosecution (Wang et al., 2016; Whittaker et al., 2015). The related problem of risk exposure could be tackled by developing financial instruments that provide insurance against disaster risk to minimize risk exposure (Sawada and Oum, 2015).

6. Limitations and Future Research Directions

We have developed a conceptual model based on the literature and from qualitative data gathered from one particular disaster event. The authors acknowledge that limitations exist with the current study. We do not claim that our findings will be applicable in all disaster situations as context is important; the actions of individuals in Chennai may not be the same as individuals in other countries due to contextual factors such as culture, affluence and accessibility. However, our study has taken an important first step in creating a framework for understanding individual level actions in post-disaster situations, a particularly under-researched area in the HOM/DRO literature. Furthermore, while we have endeavored to improve the validity and reliability of our findings by using multiple data sources and methods (Yin, 2014), we accept that our analysis and interpretation of the qualitative data may be subjective in nature.

Furthermore, future research could draw from behavioral economic models and integrate them with HOM/DRO optimization models. As documented by Dharami (2016) ‘[a]n impressive range of theoretical models have been developed to address the empirical findings on social preferences’ (p. 398). These include the Fehr-Schmidt, Bolton-Ockenfels and Rabin models. For instance, the Fehr-Schmidt model allows for other-regarding preferences through inequity aversion in an individual’s objective function, where an individual compares his own payoff with that of other people (Dharami, p. 399). As such we can enrich models of organizational supply chains for DRO (see Chakravarty, 2011; Holguín-Veras et al., 2013; Kumar and Havey, 2013; Rodríguez-Espíndola et al., 2017), to explore how optimal solutions would be altered when individual humanitarian actors’ concern of *otherness* is included.

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Tables & Figures

Table 1: Volunteerism, social preference types and likely motivators

#	Coded Text	Social preference type	Motivators
1	Unsung heroes of #Chennai: This boy demonstrated something that I will need another lifetime to witness again. There was this dilemma with the last food packet in hand to whom to give and seeing this boy's look I gave it to him. He handed it over to another kid who I ignored and said "it's okay brother, I am used to hunger, let him eat he doesn't seem to bear hunger". #ChennaiRainsHelp #ChennaiFloods #ChennaiRains	Fairness; altruism; kindness	Inequity aversion; empathy; aroused feelings
2	@Thiyagarajakuma: Helping hands doctor from Azarudeen Zarfa Clinic asks for people in and around Perumbakkam Medavakkam to call him for all medical emergencies free of charge #ChennaiRainsHelp #ChennaiFloods #PrayforChennai	Altruism; kindness	Solidarity; moral obligation; learned helpfulness
3	@yadvatejashwi: On humanitarian grounds I have decided to donate my 1 st month's salary to relief fund for Chennai flood victims #ChennaiRainsHelp #ChennaiRains	Altruism; fairness	Solidarity & social cohesion; moral obligation; inequity aversion
4	@devparakh: big salute to this man – Muttiah Muralitharan donates 10 million Rupees toward Chennai Flood Relief #ChennaiRainsHelp #ChennaiFloods	Altruism; fairness	Inequity aversion; empathy; aroused feelings; learned helpfulness
5	@SutejaChella: I stay in T Nagar and can offer shelter, food and clothes for 3 people. Please call 28157213/9962542824 #ChennaiRainsHelp #ChennaiRains	Trust; fairness; altruism;	Moral obligation; solidarity & social cohesion
6	@ram_analyst: Thanks to @Actor_Siddharth for helping #Chennai people in this terrible situation. My hat's off to you. #ChennaiFloods Driving around doing pickups and drips tomorrow. Currently food and clothing are secondary. Transport is first priority. Please RT #TNflood — Siddharth (@Actor_Siddharth) December 1, 2015 We have a 5 car convoy patrolling affected areas in #Chennai . Please collect genuine transport issues and post to me & @rj_balaji#TNflood — Siddharth (@Actor_Siddharth) December 1, 2015 If anyone has Innova or Scorpio cars to spare please contact us. We need more vehicles. #TNflood#chennaiimicro — Siddharth (@Actor_Siddharth) December 2, 2015 @Actor_Siddharth Fortuner at home Sidharth. @RJ_Balaji can someone pick it up? — Prithi Ashwin (@prithinarayanan) December 2, 2015 @Actor_Siddharth@RJ_Balaji Sid make it 6! Wil join u tmrw! — Udhay (@Udhaystalin) December 1, 2015	Altruism; kindness; reciprocity	Empathy; aroused feelings; social responsibility; solidarity & social cohesion; moral obligation; learned helpfulness
7	@Sanain_india:@IRCTC_Ltd to dispatch 1 Lakh Bottles of 'Rail Neer' [Mineral Water] to #Chennai. #WMI @RailMinIndia #ChennaiFloods #HelpChennai	Altruism; kindness	Social responsibility; solidarity & social cohesion
8	@Gur_meet: Hot fresh food is being prepared @ the #Chennai Gurudwara 4the needy & homeless.-2 #ChennaiFloods #ChennaiRainsHelp	Altruism; kindness	Social responsibility;

			solidarity & social cohesion
9	E-paper “Live mint”: “Ola, on Tuesday deployed boats to help with rescue operations. Handled by two rowers, each Ola-branded boat can ferry five to nine people and comes with food, drinking water, and sufficient umbrellas for its travellers. And yes, the service is free.”	Altruism; kindness; trust	Solidarity & social cohesion; Social responsibility
10	@Ganesh_Sabari:#ChennaiFloods #ChennaiRainsHelp #ChennaiRain Professional #courier offers free delivery to #chennai.	Altruism; kindness	Social responsibility; solidarity & social cohesion
11	@dhanyarajendran:Urgent. Sending on all platforms. Need someone with a car in Adyar, Saidapet or Thiruvannmiyur @arokiaraj:Looking for volunteers near T nagar and north chennai. Share verified contacts - #chennai, #ChennaiFloods, #ChennaiRainsHelp, #ChennaiMicro @AhamedAnsar: #Chennai’s poor shows generosity in crisis. Auto drivers offer free auto ride. @manoramaonline: Uber taxi offers free ride for two days in Chennai	Altruism; kindness; trust; reciprocity	Solidarity & social cohesion; social responsibility
12	@9hues – Watch a group of people forming human chain to save a drowning man #Chennai, #ChennaiFloods #ChennaiRainshelp	Trust; reciprocity; kindness	Solidarity & social cohesion; social responsibility
13	@ArchanaArchuu: Chennai people, please avoid super markets at least for a week. Small vendors and platform sellers are rebuilding their life from scratch. Please help them.	Altruism; kindness; reciprocity	Social responsibility; learned helpfulness
14	@asgarhid: My farm house in ECR road is free to be occupied for shelter. Food facility and electricity available. Location: Vayallur”	Fairness; trust; kindness	Social responsibility; solidarity
15	@tamilelamm: Proud of Chennai people. Muslims of #Chennai offered their mosques to flood victims and prayed on the streets instead.#ChennaiFloods @HindMakki: Muslim group cleans flood-hit temples in #Chennai. It was heartwarming to hear stories where Muslims and Hindus provided shelter and food for each other. Archith Seshadri, CNN, February 29, 2016.	Trust; reciprocity; altruism; kindness	Moral obligation; solidarity & social cohesion; social responsibility; learned helpfulness
16	@VenturaPumps: We're conducting #free repair camps allover #Chennai 4 pumps affected by #chennaifloods Go2 ur nearest Venturadealer	Altruism; kindness	Social responsibility; solidarity
17	@bikedekho:Two-Wheeler Manufacturers Organise Free Service Camps in #Chennai due to #ChennaiFloods	Altruism; kindness	Social responsibility; Solidarity
18	@premayogan: “Call Karthik at 9844197777. He is ready with 4000 packets of food at Anna nagar.#chennairains#ChennaiFloods#Chennai”	Altruism; kindness	Social responsibility; solidarity & social cohesion

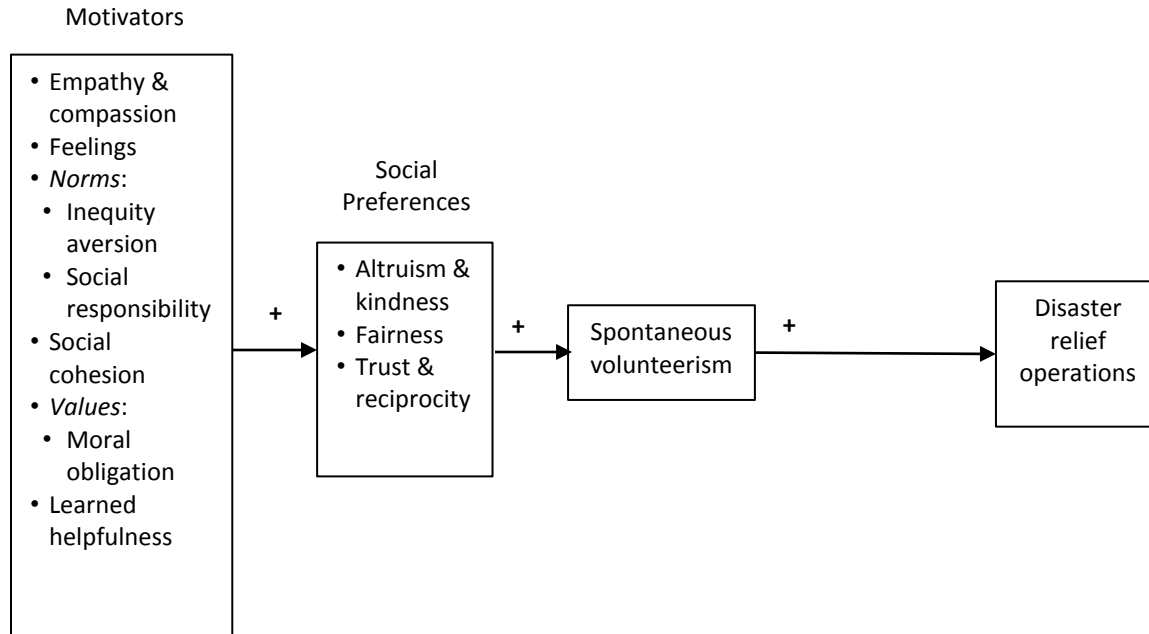


Figure 1: Theoretical framework of Spontaneous Volunteerism in Disaster Relief Operations

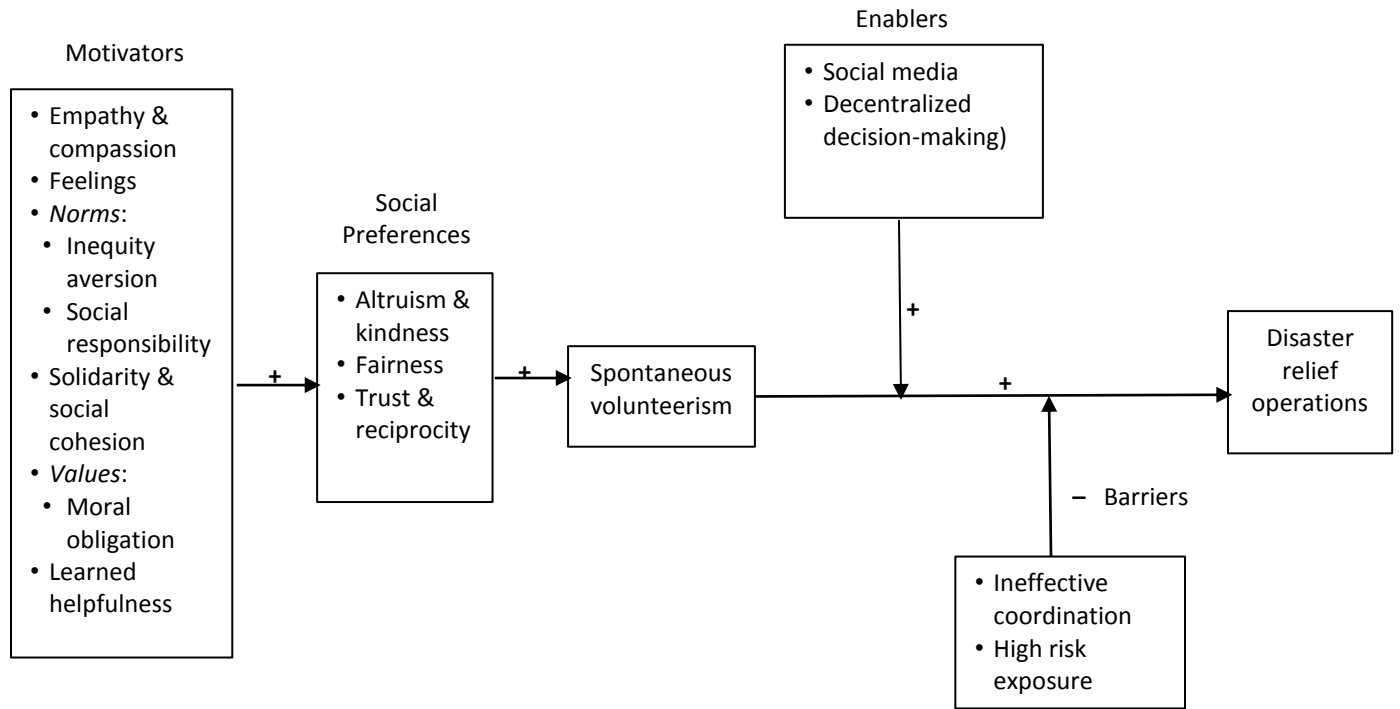


Figure 2: Conceptual model of Spontaneous Pro-Social Volunteerism for Disaster Relief Operations

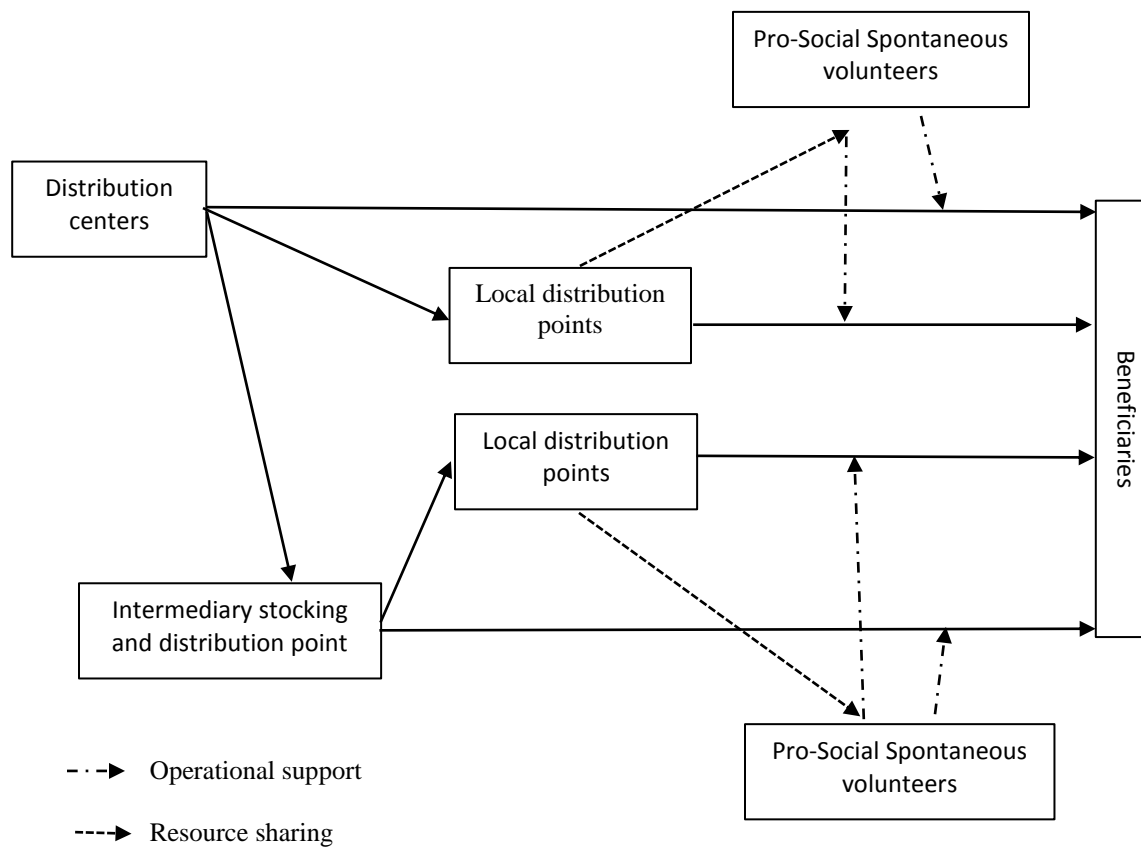


Figure 3: *Partial* Organizational Supply Chain for Disaster Relief Operations