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# Linking up the last mile: how humanitarian power relations shape community e-resilience

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## ABSTRACT

In this paper we present a qualitative, social network based, power analysis of relief and recovery efforts in the aftermath of the 2015 earthquakes in Nepal. We examine how the interplay between humanitarian power relations and e-resilience influenced communities' ability to respond to the destruction brought about by the disaster. We focus in particular on how power dynamics affect online spaces and interactions at the hyper local level (or 'the last mile'). We explain how civic technology initiatives are affected by these power relationships and show how their efforts may reinforce social inequalities – or be sidelined – if power dynamics are not taken into consideration. However, on the basis of a case study based power analysis, we show that when civic technology initiatives do strategically engage with these dynamics, they have the potential to alter harmful power relations that limit community e-resilience.

## Keywords

Power relations, e-resilience, humanitarian disaster, social capital, Nepal.

## INTRODUCTION

One of the core questions that underpins disaster research is why some communities are able to adapt and recover from the impacts of external and internal shocks, whereas others struggle (Van der Vegt et al., 2015). E-resilience refers to the ICT based practices that enable communities to respond and adapt in times of disaster (Ospina & Heeks, 2016). In recent years, Web 2.0 platforms have increasingly been used by civic technology activists in an effort to empower communities and responders in times of disaster. Civic technologies are applications run on open data platforms that aim to improve (public) services through citizen participation. In disaster settings, digital humanitarians have (for example) used crowdsourcing and social media scraping in order to create interactive online maps with crisis reports (e.g. Meier, 2015). The ability to access and share information is central to organizing an effective response (Van de Walle & Comes 2015). Indeed, e-resilience is an important enabler of collective action, for it enables communities to create (online) spaces for knowledge sharing and coordination. Furthermore, ICT infrastructure supports the ties communities have to these spaces – as well as to geographically remote connections.

Indeed, connectivity is an important marker of e-resilience. In disaster settings, as elsewhere, e-resilience is brought about through the interaction between human agents and material infrastructures and devices. Given the important role of human actors it is worth analyzing the interplay between e-resilience and relationships of power. As highlighted by Comes and Adrot (2016), the impact of power relations on information sharing and collective action in disaster settings has to date received little attention. Civic technology platforms designed for disaster settings generally aim to empower affected citizens and humanitarian professionals by providing a platform where communities and humanitarian professionals can share information and coordinate. In this paper we will show that technology driven social empowerment is never just the product of technology itself but the product of the interplay between technology and social power relations. We contend that power relations and technology are mutually constitutive: power relations shape technology and technology shapes power relations (Williams & Egde, 1996).

Most humanitarian civ tec platforms tend to present themselves as 'a-political technical solutions' and do not

critically reflect on the power relations that shaped their design or the power relations that mark the setting where they will be rolled out. However, by failing to take into account how power relations shape the interactions in their online spaces, civ tech platforms risk reinforcing social inequalities. As we have argued elsewhere, the unintended consequence of this may be that those who are most in need benefit the least from civ tech initiatives (Mulder et al., 2016). Indeed, humanitarian civ tech initiatives that do not pay adequate attention to power relations may fail to achieve one of the humanitarian core objectives: reaching those most in need. In this paper we will argue that there is a strong interplay between power relations and communication networks (in both the infrastructural sense and as relating to human interactions). As others have pointed out, the usage of ICTs in crisis settings is linked to the influence actors have over an emergency response as a result of their network position (Hu & Kapucu, 2014). In this paper we extend this argument by looking at the different levels, forms and spaces (Gaventa, 2004) through which networked power relations are enacted at the last mile of a humanitarian response (i.e. at the hyper local level) – and the impact this has on community resilience. Gaventa's power cube (2004), discussed below, shows how these loci and forms of power can interlink. The cube is intended to help actors identify and analyze how power relations affect their specific projects and objectives and suggests strategies for repositioning. In this paper we add to the ISCRAM debate on the last mile by integrating Gaventa's approach to analyzing power with a focus on information networks. Using this approach we explore the interplays between power relations, connectivity and e-resilience in a humanitarian setting.

The extent to which communities are able to help themselves – and attract external assistance during a crisis – is greatly influenced by the quality and quantity of their relationships with each other and their connections to the rest of the world. Indeed, social capital is inherently relational: it resides in the links and connections between individuals and groups. Social capital refers to communities' ability to share assets (such as information) and work collectively towards a specific end (e.g. Putnam, 2000). Given its importance, control over (access to) information and communication flows is often an important locus of the power struggle between established institutions and those who seek to challenge them (Castells, 2011; 2013). It is worth noting that in a humanitarian setting disadvantaged communities tend to be digitally underprivileged in multiple intersecting ways. They tend to have less access to internet enabled devices, are trapped behind linguistic and literacy divides and depend on sparse and vulnerable ICT infrastructures. Indeed, the co-evolution of communities and their environments can give rise to deeply embedded societal inequalities and structural vulnerabilities (Oliver-Smith & Hoffman, 2002). In terms of connectivity, it often gives rise to network structures whereby less powerful groups have fewer and less reliable ties to the rest of society whereas more powerful groups have a greater number of more dependable ties that link them up. In this paper we will show how the interplay between the destructive force of a disaster and the evolved inequalities and power relations that mark a humanitarian setting can result in the least resilient parts of information networks being hit hardest – and information flows (and hence power) being concentrated into the hands of elites. We also discuss how civ tech initiatives could be used to counteract this process.

In this paper we present a qualitative, social network based, power analysis of relief and recovery efforts in the aftermath of the 2015 earthquakes in Nepal. We focus in particular on the interplay between power dynamics at the last mile and in the 'claimed' and 'invited' spaces civ tech initiatives helped create. The latter refers to spaces (or opportunities) for community participation and interaction created by formal institutions and the former refers to spaces (or opportunities) created by grassroots initiatives and communities (Gaventa, 2004). The purpose of this paper is to provide an example of how a power analysis could help civ tech initiatives strategically position themselves in a humanitarian setting so as to genuinely boost e-resilience at the last mile and empower those most in need. Looking at the power relationships that mark affected communities, humanitarian responders and civ tech initiatives, this paper addresses the following research question: *How did the interplay between power relations and e-resilience influence access to information and knowledge sharing in the aftermath of the 2015 earthquakes in Nepal?*

## **CIVIC TECHNOLOGIES AND E-RESILIENCE**

The importance of maximizing the resilience of local response systems – as opposed to forging standardized responses in a top down manner – has been recognized for over thirty years (e.g. Drabek, 1983). It is impractical to prepare standardized top down response scenarios for all potential hazards at the hyper local level. As such, fostering the ability of communities at the last mile to respond and adapt with agility to the impact of shocks is more fruitful. ICT enabled connectivity has the potential to boost local response capacity at times of disaster for it enables communities to effectively leverage their social capital. After all, assets such as information and knowledge can only be used for effective collective action in times of disaster when they are shared and combined. Taking a network perspective, the extent to which nodes are connected to each other within clusters and the extent to which clusters are connected to each other across a humanitarian response, greatly influence

the resilience of the social structure as a whole in the aftermath of a disaster. Resilient social systems tend to be marked by strong ties at cluster level that are rich in “bonding social capital” (Putnam 2000). This means that people are able to make legitimate claims on the time and resources of other members of their cluster by appealing to people’s their sense of group loyalty. Furthermore, resilient systems tend to be marked by multiple direct and indirect ties between disparate clusters. The reason for this is that organizing relief at times of disaster requires a high level – and range - of resources and skills. Isolated clusters tend to lack diversity and do not enable people to access resources or skills beyond what they have already. Access to external networks, so called ‘bridging social capital’ (Putnam, 2000) is essential for enabling effective cross-network collaboration. The key thing to note here is that disadvantaged groups tend to rely on ICT infrastructures that are sparser and more vulnerable to the impact of a disaster. Small remote rural villages in the mountains, for example, may depend on one core power generator and become cut off from mobile and wifi networks if this power generator gets destroyed. As such, the least powerful in society are often most likely to become disconnected when a crisis occurs. This means that these disadvantaged groups are less able to share information – or coordinate – with geographically remote nodes in their networks. As a result, they are less resilient and less able to respond effectively in times of disaster. Unreliable connectivity also increases vulnerability at ‘the last mile’ in another way: poorly connected (rural) communities tend to respond too late to hazard warnings (e.g. LIRNE Asia, 2008; Singh Bedi, 2006).

Digital inequalities – such as unequal access to reliable ICT infrastructures - map strongly onto other inequalities. On the eve of the earthquakes in Nepal in 2015, 85% of rural Nepalis had never used social media or the internet. They depended on more traditional ICTs, such as telephones, radios and televisions (Girard, 2015). 50% of their urban counterparts, by contrast, used social media on a regular basis (ibid). Digital inequalities contribute greatly to the fact that the least resilient parts of a society are also the least visible in digital data sets. The importance of visibility at times of disaster cannot be overstated. In the immediate aftermath of the earthquakes in Nepal, traditional and social media initially ‘overlooked’ badly hit rural communities in the worst hit districts, focusing instead on the damage suffered in the Kathmandu valley area. The crisis crowdsourcing initiative Quakemap, for example, generated a data set that was strongly skewed towards this area, in spite of the platforms’ best efforts to lower barriers to participation. The systemic power imbalances between urban and rural Nepal meant that Kathmanduites were relatively well-connected to traditional and social media based information networks – and able to access online created spaces (such as civ tech platforms or Facebook groups) whereas villagers in the mountain areas of Gorkha (the epicenter) were not. As a result of the over-representation of the Kathmandu valley in traditional and social media, formal responders, such as government bodies, (I)NGOs and IOs, initially focused their aid efforts in this area, even though other districts had been hit much harder.

As such, because many civ tech initiatives had not strategically addressed the power imbalances that shaped access to and participation in their online resilience boosting spaces, their efforts did little to address the weakest point in the humanitarian information flows: linking up the last mile. Furthermore, because their skewed data sets reflected the digital divides that mark Nepal, their efforts may (unintentionally) have reinforced existing inequalities as their open data pointed responders to the better connected communities rather than those who were most in need (e.g. Mulder, 2016; Crutcher & Zook, 2009; Elwood, 2007; Goodchild, 2007).

## FOCUS AND METHODS

This paper is based on a power analysis of the socio-technical relationships that marked rural Nepal at the hyper local level (or ‘last mile’) in the aftermath of the 2015 earthquakes in Nepal. Our focus is on the interplay between power and information networks. We treat these networks as both social and material in nature. Indeed, we regard these two aspects as mutually constitutive. In telecommunications, the term “network” refers to the connections between computers and other electronic devices that enable them to exchange data. A “social network”, by contrast, is often defined as the connections between social agents that allow them to exchange information (e.g. Burt, 2000) and work collectively towards a specific end (e.g. Putnam, 2000). However, in today’s hyper-connected world, or what Castells’ (2011) has termed the *Network Society*, these two types of structures are deeply interconnected. Commonly-used technologies play a central role in shaping the interactions and flows that give rise to social network structures (e.g. Leonardi, 2011). ICT networks influence which social agents can exchange information and work together.

Conversely, social agents play a central part in determining what shape ICT networks will have. Ties between agents are often actualized by ties between devices. This holds across the globe. Even communities living in remote villages in the Himalayas have been connected to the wider world via radio and telephones for decades. Getting information and other resources to such communities in times of disaster is commonly referred to by humanitarian professionals as “the last mile challenge”. In telecommunications, the term “the last mile” is

widely used to refer to the final leg of ICT networks: the last bit of the chain that reaches the premises of end-users. As such, the debate around linking up the last mile often centers on technical problems or the absence of communication infrastructure at the hyper local level. However, whether and how “the last mile” gets linked up with is also heavily influenced by social factors. Furthermore, the impact connectivity has on a community’s ability to respond effectively in times of disaster is also shaped to a very large extent by the power relations that mark that particular community. As such, in this paper we present a power analysis of the socio-material last leg of information networks, so as to explain the impact of power on e-resilience and people’s ability to organize an effective response. Whilst our focus is on the interplay between power and networks, we do not use classical social network analysis (SNA) in this paper. In our case study we describe power relations that generally mark rural Nepal at the hyper local level from a social network perspective, but do not present a SNA graph of one specific village showing the actual nodes and ties that mark that unique setting. We have chosen a qualitative approach, as this allows for detailed and in-depth investigations of network relations; the processes involved; how and why networks change; as well as to what extent they facilitate collective action (Jack, 2008).

This paper is based on research carried out by a team of researchers – including the authors of this paper - in the aftermath of the 2015 earthquakes (Wolbers et al., 2016; Baharmand et al., 2016). It draws on insights gained during three months of fieldwork (observations and open interviews) and a review of the academic literature, practitioners’ texts and social and traditional media. Purposive sampling was used to select respondents. These individuals were identified and contacted through social media (especially LinkedIn and Facebook) and through introductions by existing contacts in the field. The findings presented in this paper are the product of an iterative analysis, whereby the researchers continuously moved between data collection, data coding and the academic and professional literature. As such, findings have been triangulated by going back to respondents and checking them against the existing literature (Strauss & Corbin, 1994). In the analysis presented here we focus on the relational information about the interplay between power and e-resilience found in these sources. Our power analysis explores the different dimensions of power, as usefully summarized in Gaventa’s power cube (see figure 1, below).

Different scholars have taken different approaches to power. Broadly speaking, these approaches can be categorized as either ‘episodic’ or ‘systemic’ (Fleming & Spicer, 2014). Whereas the former refers to action-based power held by actors, the latter refers to more pervasive forms of power that are embodied in a web of relationships and discourses that affect everyone (Gaventa, 2004). Examples of episodic power are the ability of some actors to coerce or manipulate other actors. Examples of systemic power are the ability to manufacture consent and shape people’s beliefs. Gaventa distinguishes between visible power (e.g. the power to coerce); hidden power (e.g. the power to manipulate); and invisible power (e.g. the power to shape people’s beliefs). The latter includes the power of discourse, i.e. the power to shape subconscious attitudes and behavior through the repeated use of tropes, formal definitions, imagery, architecture and so on (Foucault, 1975). Gaventa refers to visible, hidden and invisible power as different ‘forms’ of power. These different forms of power play out at different levels. In a humanitarian setting, the ‘global’ level is the international community; the ‘national’ level refers to actors working at the national level, generally from the capital city; and the ‘local’ level refers to all action that takes place at the sub-national level. Gaventa points out that these different levels are all interlinked and all affect each other, stressing the importance of initiatives that link across the different levels. Online spaces tend to fall outside the global, national and local divide.

Spaces like this have been called ‘glocal’ (Harcourt & Escobar, 2002) and hence constitute opportunities for communities to reposition themselves and to some extent transcend local power relationships. They also provide formal responders with ways of reaching down and facilitating a better vertical integration of the response. The final side of Gaventa’s power cube refers to ‘spaces’. These are locations or opportunities for interaction, such as knowledge sharing or coordination. These spaces are located at (or across) specific levels and are marked by the interplay between specific forms of power. A ‘closed’ space refers to decision-making by power holders behind closed doors. An ‘invited’ space refers to an opportunity - created by formal institutions - for communities to contribute to decision making, albeit not on an equal footing. Finally, claimed or created spaces refer to spaces or opportunities communities or grassroots initiatives have created for themselves in order to voice their views and coordinate their actions. Figure 1 below shows how the different axis of power interlink. The arrows suggest ways initiatives can strategically position – or reposition themselves in order to address the specific power dynamics that undermine their social objectives.

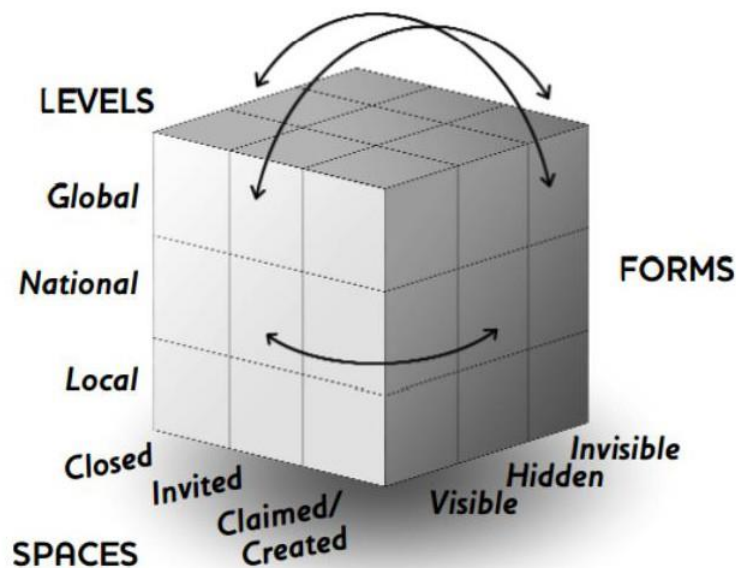


Figure 1: The Power Cube (Gaventa, 2004).

#### CASE STUDY: A POWER ANALYSIS OF E-RESILIENCE AT THE LAST MILE

In the spring of 2015, Nepal was hit by two large earthquakes, which occurred 17 days apart. As a result, close to 9000 people died and a half a million properties were destroyed. In response, a large scale humanitarian operation was launched in which national and international actors worked alongside each other (and sometimes together) in aid and relief projects. In this case study we address this paper's research question by describing how the interplay between power relations and e-resilience influenced access to information and knowledge sharing in the aftermath of the earthquakes. The first thing to note is that the power relations that shaped the interactions that marked the humanitarian response played out over different levels, from the global, to the national, to the local and to the global. Looking at ties between affected communities, government authorities, NGOs and grassroots initiatives in Nepal, we see that the social network structure that linked up the different levels was markedly layered. Whilst network clusters at the (inter)national level were connected to each other through numerous redundant ties, they were less well connected to clusters below them (at district level) and generally poorly connected to the clusters at the lowest levels (village and ward). In other words, due to the layered nature of the response, power relations at higher levels only interacted with those at the lowest level at a few key points. These points were occupied by actors who consequently had a lot of influence over access to higher level networks and spaces.

Zooming in to the hyper local level, we see how power relations played out in different forms. Nepali society is marked by strong connections between individuals from similar backgrounds. As such, community networks tend to be rich in *bonding social capital*, (explained above) which enables people to work together effectively with other members in their network. Geography is another important variable that shapes community networks: most rural Nepalis, even those in the remotest villages, are closely connected to people in Kathmandu or abroad. As a result of rural economic decline due to the civil war (1996-2006) Kathmandu has doubled in size since 2000. Furthermore, today over 2 million Nepalis (7% of the total population) work abroad in places like Malaysia, Qatar and the Gulf States. As such, Nepali 'local communities' stretch over all levels of a humanitarian response: from the local to the national to the global. Rural communities have depended on 'traditional' ICTs (such as telephones and radios) for decades in order to maintain social relationships with their geographically dispersed close ties. However, their economic marginality is reflected by the ICT network infrastructures that mark Nepal. The infrastructures they depend on are sparse, less well maintained and hence more vulnerable to the impact of shocks. The impact of the quakes in 2015 on this vulnerable set up inevitably resulted in high levels of destruction, limiting the ability of many rural households to effectively involve distant husbands and sons in family efforts to respond and cope with the impact of the disaster. It also limited their ability to engage with external information and resource networks.

Not all social groups within rural communities were equally affected by the earthquakes and the resulting destruction of ICT infrastructure and devices. Historic power imbalances have given rise to deeply embedded socio-economic inequalities in rural Nepal that continue to shape people's resilience to this day. On the eve of

the disaster, low caste groups, for example, tended to live in more hazardous rural locations marked by poor ICT infrastructure. Upper caste groups (i.e. Brahman / Chhetri)<sup>1</sup> by contrast, were significantly more likely to be among the rural elites and live in the safer, more connected parts of their villages (in better constructed houses, perhaps even with their own back-up power generators). As such, low caste groups were significantly more likely to become disconnected as a result of the earthquake than upper caste groups. There are other socio-economic inequalities that mark rural Nepal, such as those based around ethnicity, gender, age and able-bodiedness, to name but a few. The ability of people to respond and adapt to the impact of the quakes was heavily shaped by the interplay between power and these social identity markers. Upper caste groups, for example, frequently held official positions of authority, working as local bureaucrats or local level political party leaders. Many also held power informally, such as community leaders or locally respected men (often called 'intellectuals'). Rural elites tended to benefit from vertical networks and positions of influence. As such, if they did become disconnected, they were able to call upon their connections and resources to maintain or restore their connectivity relatively quickly. The ability of local elites to stay connected is an example of action-based power, also called 'visible power' (Gaventa, 2004), or 'coercion' (Fleming & Spicer, 2014). Coercive power is based on actor's formal position (Weber, 1947), personality (House, 1968) and possession of valuable resources (Pfeffer & Salanick, 1974).

Thanks to their vertical networks and positions of influence, rural elites hold an established role in connecting their communities to external information and resources. Indeed, their vertical networks constitute vital bridging social capital for their communities. However, the unequal impact of the quakes on the connectivity of different rural socio-economic groups meant that control over information flows became even more concentrated into their hands. Their broker position between their rural communities and the wider world gave them the power to influence what information was shared and how it was presented. As such, it gave them the power to manipulate; another example of action-based or visible power (Fleming & Spicer, 2014). They were able to mobilize people's biases (Alexander, 1979) and shape expectations (Gouldner, 1970). Many Nepalis have very low expectations about their government and brokers can easily mobilize this bias, confirming people's beliefs that little or no help will be provided by the central government. By doing so, the brokers can strengthen people's perception of dependence on them (the local power holders). This 'hidden power' allows brokers to control politics backstage (Gaventa, 2004). As such, the uneven destruction of ICT infrastructure strengthened the ability of local elites' power to coerce and manipulate. This does not mean that local elites did not act in the best interest of their communities. However, with few alternative means of accessing information and resources local communities were not empowered to hold these men to account.

There are more long-term, systemic and 'invisible' forms of power that contribute to the influence of local elites over communities at the hyper local level. The power to dominate refers to the ability of societal elites to make relations of power appear inevitable and natural (Fleming & Spicer, 2014). Unlike the action-based powers to coerce and manipulate, which are episodic in nature, this refers to long-term sustained efforts to persuade, through the endless repetition of ideology (Alvesson, 1987); the manufacturing of consent (Burawoy, 1979); and exerting pressure to conform to certain social institutions (Fligstein, 1987). A very important social institution that shapes power relations in Nepal is patronage politics. The ideology that underpins patronage politics holds that patrons and clients have moral obligations towards one another: patrons should use their connections and resources for the benefit of their clients – and in exchange, their clients should support the political and economic goals of their patrons. Non-conformity with these expectations can be punished as a moral transgression. As such, rural elites often perform their broker function as their 'duty' as patrons towards their 'clients'. Many Nepalis accept patronage politics as the status quo and have more confidence in patronage politics than in their weak formal institutions (as has also been observed elsewhere, e.g. De Waal, 2009).

The final form of power that contributes to local elites' control over access to information and knowledge sharing we will discuss in this paper is subjectification (Foucault, 1975). Subjectification is another example of systemic or 'invisible' power. It refers to how people's sense of self – and behavior towards others – is formed through the endless repetition of normative narratives around identity and behavior (i.e. "you should not touch Dalits, they are impure"). The establishment of 'formal categories of people' for legal or medical purposes feeds into this. At the hyper local level, these power relationships are manifested in numerous ways, such as inclusion and exclusion from power loci due caste or ethnic bias. Another example is the fact that property and land titles were generally registered in the name of husbands and sons: a practice that is generally regarded as 'normal' and part of the unquestioned status quo. (However, this custom made it hard for widows and the wives of migrant workers to claim compensation in the aftermath of the 2015 earthquakes). The power of subjectification also contributed to the fact that at community meetings, women would normally defer to men, considering it right that relief (and politics) be discussed by men. Table 1 below provides a summary of this analysis. It is important

<sup>1</sup> which is not to say that all Brahmans / Chhetris are rich, powerful and well-connected

to flag up that a power analysis is very context specific and that power relations that shape a particular space in one humanitarian setting will be different from those in another. The purpose of this analysis was to explore the links between connectivity, e-resilience and local power relations. We will now briefly discuss a civ tech initiative that specifically sought to address the problem ‘offline’ communities faced in terms of accessing information, broadcasting needs and holding local power holders to account.

**Table 1 – A power analysis: the influence of patrons on decision making spaces at the local level**

Power dimension	Levels	Spaces	Network position / social capital
Coercive (visible)	Local	Closed (behind the scenes decision making) Invited (at community meetings – power imbalance attendees)	Patrons (have large and diverse networks)
Agenda setting (hidden)	Local	Closed (behind the scenes decision making) Invited (at community meetings – power imbalance attendees)	Brokers (bridge position in network)
Hegemonic (invisible)	Local	All (systemic)	Patrons (client dependency = broker position cannot be challenged)
Subjectification	National	All (systemic)	Paternalism (broker position = how things should be)

**Mobile Citizens Helpdesks**

On the day after the first earthquake, the open data and accountability civ tech organizations Accountability Lab and Local Interventions Group launched an initiative called Mobile Citizens Helpdesks. During the initial relief and recovery phases, every month they sent volunteers with hand-held devices into the 14 worst affected districts, reaching out to communities at the hyper local level. In addition to surveying affected communities about their views on the effectiveness and fairness of the response, the Mobile Helpdesks volunteers also acted as information conduits, providing communities with answers to their specific questions, addressing their particular needs. They would, for example, help victims use the radio to reunite with their families, find out how get to hospitals for critical surgery, find tents to sleep in or find out how to get the damage to their homes assessed. Being well connected to government actors and (I)NGOs at the national level, they enabled a vertical flow of information, sharing the surveys upwards, with national level actors, and sharing the insights gained from their contacts at government bodies and (I)NGOs downwards. Mobile Citizens Helpdesks worked closely with national level actors during the relief and recovery phases of the humanitarian response. In the immediate aftermath of the earthquake, the initiative was, for example, supported by a 1234 hotline, manned by volunteers based at the Nepalese Home Ministry. Linking up with the commercial sector, the initiative was also supported by a SMS toll free platform managed by a private company (Sparrow SMS). Furthermore, in partnership with UN bodies and INGOs, the surveys fed into a joint Inter-Agency Common Feedback Project. As such, Mobile Citizens Helpdesks made an effort to integrate its data collection approach with the processes used by formal responders, thus ensuring that the information collected also addressed the needs of these organizations.

Humanitarian and government organizations generally recognize the potential of open crisis data civ tech platforms, but struggle to make effective use of such initiatives. They find it hard to fit this kind of information into their organizational routines given technical incompatibilities and the time pressure inherent in a disaster response (e.g. Hughes & Tapia, 2015). As such, the strategic choice the Helpdesks made to design compatible data collection formats and processes greatly contributed to the uptake of their work. This choice constitutes a calculated use of format or template power (Castells, 2013). Actors who determine the design of technical formats and organizational routines have the power to enable or block effective connections between their own organization and potential partners. However, whilst helpful in terms of uptake, there was also a downside to designing instruments, templates and routines fine-tuned to the specific interests of partner organizations and donors. This downside was that ‘miscellaneous’ information that affected communities shared that did not fit’



the standard reporting formats (and was perceived as not particularly relevant to partners and donors) was not adequately captured.

Citizens Helpdesks also sought to establish itself as a key actor at local level. The civ tech initiative recruited two local people with established networks to key local stakeholders (including ties local government officials) as ‘frontline associates’ in each district. These associates lived locally and made sure that their phone details were known widely in the community, so as to ensure accessibility. Central to the work of the Helpdesks were its efforts to link up affected communities to key actors at all levels. They used the established Nepali tradition of ‘community meetings’ in order to create an ‘invited space’ (Gaventa, 2004) so as to connect citizens with village and district level actors. Being vertically integrated with ties to influential actors at all levels (including the national and global level) they sometimes managed to secure the attendance of Chief District Officers at these community meetings. This is relevant as these actors are at the heart of all formal government and NGO relief and recovery initiatives at district level. Being incredibly well connected, these influential nodes can use their large and diverse networks to facilitate vertical relief and recovery efforts.

As such, Citizens Helpdesks sought not only to provide community members with a platform where they could ‘voice’ their concerns – but also attempted to connect them with institutional actors who had the ‘teeth’ to take action on the basis of these concerns (Fox, 2016). Furthermore, they gave ‘eyes’ to stakeholders at all levels by inviting local journalists to these meetings (e.g. those working for local radio stations). Indeed, many of their frontline associates were professional journalists themselves. By facilitating the public recording and broadcasting of what was discussed at these meetings they aimed to put pressure on local power holders to act in accordance with their promises. Aware of the different power relations that shape community meetings, the Citizens Helpdesks made a conscious effort to ensure that the voices of those less confident were also heard. Women and disabled people often felt uncomfortable publicly expressing any views at these meetings. The volunteers from Citizen Helpdesks addressed this issue by collecting their views prior to the meeting and having someone else read them out.

Citizen Helpdesks thus created an invited space where civ tech volunteers sought to mediate power relations between participants. They made a real effort to ensure that the civ tech initiative was fully integrated along all levels: the local, the national and the global. Joint initiatives were set up with formal responders, which ensured that collected data was compatible and useful for these organizations. Perhaps most importantly, the Helpdesks stimulated vertical information flows in both directions. They sought to boost e-resilience by linking ‘offline’ communities up to wider information networks through focal points with handheld devices, but also by relying on traditional ICTs, such as radio and cell phones. Indeed, their volunteers acted as conduits for offline communities to online glocal spaces. By providing alternative ties to the wider world, the Helpdesks somewhat reduced local elites’ influence over information flows and provided rural communities with more options for leveraging the social capital in their geographically dispersed personal networks.

## DISCUSSION AND CONCLUSION

Access to information and the sharing of knowledge have the potential to shape the effectiveness of all stages of disaster management, from prevention to recovery. As such, civ tech initiatives are (rightly) believed to have *the potential* to boost community e-resilience and make a humanitarian response more agile and adaptive to specific local conditions (e.g. Meier, 2015). At this point it is important to consider that historically most new technologies have been hailed as democratizing and liberating forces when they first came to market (Winner, 1980). Whilst these innovations - such as factories, cars and radios - clearly did (and do) hold the potential to empower communities, the actual impact of these technologies on people’s agency has varied greatly by social group and by social context over time. In all these examples, actors in positions of influence have been able to shape both the technologies and the socio-economic relations surrounding them – to tailor to their own needs. Indeed, artifacts and technologies have a distinct political dimension (ibid).

In their article on vulnerability assessments, Pronk et al. (2016) show how measurement instruments and evaluation procedures (i.e. assessments) designed to measure social vulnerability to tsunami risks in Portugal reflect the perceptions of vulnerability common among national-level government bureaucrats - and not those of local stakeholders. In our analysis of the instruments used by the Mobile Helpdesks in post-earthquake Nepal we identified the same pattern: the instruments were calibrated to collect information that national and global level partners and donors considered important and did not adequately capture the other ‘miscellaneous’ information affected communities shared. As such, these technologies were not ‘neutral’ but embodied the priorities and beliefs of those with power. If, in the case of Portugal, all national level bureaucrats boarded a spaceship to Mars and never engaged with tsunami vulnerability evaluations again, their priorities and beliefs would continue to influence the assessments as their views have become encoded in the instruments and processes that are central to how vulnerability is measured. Indeed, in this sense technologies have agency of their own,

independent from their current users. The priorities and interests of those who influenced their design continue to shape the social settings that use them even when those ‘designers’ are long gone (Winner, 1980). When we look at the design of the ICT network infrastructures in Nepal, we note that urban areas are served by better more reliable structures, whereas rural areas depend on sparser, more vulnerable networks. This lay-out clearly reflects the interests of urbanites and is a product of the historic power imbalances between urban and rural Nepal. This pattern holds when we zoom in to the last mile in rural Nepal. As we have described above, in rural communities, elites had better and more reliable ties with wider information networks than less privileged groups. As such, the latter were more likely to become disconnected as a result of the impact of the earthquake.

Digital inequalities are a form of systemic invisible (hegemonic) power that plays an important role in shaping how civ tech initiatives influence e-resilience. Social media has the potential to greatly boost local response capacity because it enables the sharing of resilient behaviors through peer-to-peer learning – and caters for diverse and contextualized learning needs (as opposed to a top down ‘one size fits all’ approach to informing) (Dufty, 2012). Many civ tech initiatives aim at boosting e-resilience by fostering self-organization and learning at times of disaster by enabling community participation in a humanitarian response – and by making crisis relevant information publicly available through open data platforms. They create what Gaventa has termed ‘claimed spaces’ through which they aim to empower both communities and responders so as to make the response more agile and adaptive to local circumstances.

However, digitally underprivileged groups often struggle to participate in online spaces that have been created for the sharing of knowledge and coordination in times of disaster, especially when the disaster has taken them effectively ‘offline’. Their lack of connectivity means that they are limited in the extent to which they can share information or organize collectively with geographically distant nodes in their network, such as their migrant husbands or sons. Due to their lack of e-resilience, they are often forced into a greater position of dependence on local elites, who – thanks to their influence and resources – are generally able to quickly reestablish their connections, if they got disconnected at all. As a result, control over the flow of information gets concentrated into the hands of local power holders. Whilst these men may have the best intentions for their communities, the fact that people have few alternative means of accessing information means that they are not able to hold these men to account. In this paper we have provided an example of how a civ tec could be strategically deployed so as to boost local accountability through e-resilience, using focal points, hand-held devices and ‘traditional’ ICTs to link up the last mile.

In summary, our power analysis of the social and material relations at the final leg of information networks shows how different forms of power shape community e-resilience. We have endeavored to show that civ tec initiatives have the potential to boost e-resilience at the last mile, provided they strategically and critically engage with the power relations that mark the settings where they operate and the context of their own design. Platforms that limit themselves to providing tools for civic ‘side-efforts’ may end up not being used by responders. Civ tec initiatives that believe themselves to be ‘a-political’ may inadvertently reinforce systemic inequalities. Our case study shows that it is possible for civ tecs to boost e-resilience through strategic vertical integration, linking ‘offline’ communities at the ‘last mile’ to district and national information networks. Our case study also shows the tension between ensuring uptake by humanitarian responders and capturing the priorities of affected citizens on the ground as the information provided may not be the information that is wanted. A power analysis such as the one presented in this paper could help civ tec initiatives critically reflect on their potential impact so as to make informed and strategic choices in terms of how they position themselves.

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