

Challenges in humanitarian information management and exchange: evidence from Haiti

Nezih Altay Associate Professor of Operations Management, Department of Management, DePaul University, United States, and **Melissa Labonte** Associate Professor of Political Science, Department of Political Science, Fordham University, United States

There is a growing recognition of the critical role information management can play in shaping effective humanitarian response, coordination and decision-making. Quality information, reaching more humanitarian actors, will result in better coordination and better decision-making, thus improving the response to beneficiaries as well as accountability to donors. The humanitarian response to the 2010 Haiti earthquake marked a watershed moment for humanitarian information management. Yet the fragmented nature of the response and the use of hierarchical models of information management, along with other factors, have led some observers to label the Haiti response a failure. Using an analytical framework often found in humanitarian emergencies, this study analyses challenges to information flow in the Haiti case and the implications for effective humanitarian response. It concludes by offering possible paths for overcoming such challenges, and for restoring the value and utility of humanitarian information management and exchange in humanitarian relief settings.

Keywords: clusters, coordination, decision-making, evaluation, Haiti, humanitarian, information, response

Introduction

On 12 January 2010 a 7.0-magnitude earthquake rocked Haiti, devastating the capital of Port-au-Prince and nearby municipalities, killing or injuring more than 500,000 people, and displacing at least two million (IDMC, 2011). The Haitian government's already fragile capacity to respond to this rapid-onset disaster was all but decimated. Consequently, international media coverage of the humanitarian crisis sent hundreds of humanitarian organisations scrambling to get on the ground in Haiti as quickly as possible. This created a massive imperative to act before gathering sufficient information (DARA, 2010).

Three weeks after the earthquake, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) reported that 400 organisations and agencies were operating in Haiti; it later revised this number to 2,000 (IASC, 2010). Furthermore, the sheer influx of material resources far exceeded that of any other humanitarian response. OCHA estimated that by December 2010, more than \$3.5 billion had been pledged for Haiti earthquake relief, making it the largest humanitarian response ever mounted, comparable only to the 2004 Indian Ocean tsunami response (OCHA 2010).

From a humanitarian response perspective, Haiti demonstrated the critical importance of getting information flows ‘right’. In the quake’s immediate aftermath, the lack of readily available, highly qualified senior humanitarian leadership was glaring. This had a negative impact on coordination as well as on effective humanitarian information management and exchange (HIME) at both the strategic and operational levels. At the operational level, information was not reinforced by local knowledge because many agencies started with the assumption that there was no data available;¹ moreover, the government, national non-governmental organisations (NGOs) and civil society groups were marginalised from most aspects of the humanitarian response, even within the cluster approach.² Coordination arrangements between clusters were rigid, hierarchical and cumbersome. To the degree that HIME was practised among cluster partners, it was uneven and ad hoc while having a minimal effect on decision-making.

Just over one month following the earthquake, a leaked e-mail to senior colleagues from then OCHA head, John Holmes, painted a stark picture of a humanitarian response system teetering on the edge of failure in spite of the unprecedented worldwide outpouring of emergency relief and support. While noting that the UN presence in Haiti had saved lives, Holmes expressed disappointment that ‘only a few clusters have fully dedicated cluster coordinators, *information management focal points* and technical support capacity, all of which are basic requirements for the efficient management of a large scale emergency operation’ (Lynch, 2010, emphasis added). Some clusters had not yet established response strategies or identified response gaps, prompting doubt about OCHA’s response capacity.

HIME is critical to inter-organisational coordination in humanitarian operations; many consider it a cornerstone of disaster response success or failure (Christopher and Tatham, 2011; Maitland, Ngamassi Tchouakeu and Tapia, 2009; Tomasini and Van Wassenhove, 2009). As the international focal point responsible for coordinating global humanitarian relief, OCHA values humanitarian information as the *sine qua non* of humanitarian response, enabling both agency programming and inter-agency cooperation (OCHA, 2006, p. 2). Alongside effectively managing the proliferation of actors within the humanitarian system, senior OCHA officials emphasise that humanitarian information management and technology will profoundly affect the form and content of future humanitarian action and response (OCHA, 2006, p. 7).³

HIME is not only a prerequisite for all other flows in a humanitarian response, but it is also the principal source of all situational awareness, crisis decision-making and coordination. It undergirds the humanitarian response in its entirety. Within the humanitarian sector, there is now consensus that better communication, data collection and information management will lead to better risk assessment, targeted prevention and more effective preparedness activities in humanitarian action (OCHA, 2002; 2007; Van de Walle, Van Den Eede and Muhren, 2009).

Global humanitarian response to the 2010 Haiti earthquake may well have ushered in a new era for HIME. Yet the fragmented nature of the response system and its reliance on hierarchical models, along with other factors, have led some to label the

Haiti response ineffective and unable to meet expectations at many levels (Haver, 2011; O'Hagan, 2010).

This paper analyses the implications of impediments to effective information flows in the Haiti case, using a framework centring on eight factors that characterise humanitarian emergencies (Day, Junglas and Silva, 2009). While HIME offers the promise of timely access to relevant information, how such information is disseminated and utilised by decision-makers through coordination mechanisms is constrained by their ability to recognise and mitigate information flow impediments. Insight into information flow impediments is therefore crucial to a solid understanding of the limits of the humanitarian response in the Haiti case; it helps to explain why accountability and coordination, as manifested through the cluster approach, seemed so elusive at precisely the time when they were most needed to serve beneficiary communities and save lives.

This research focuses on the immediate aftermath of the Haiti earthquake—the emergency response phase of the disaster management cycle. The following sections provide an information-centric overview of the humanitarian system, introducing the authors' analytical framework of information flow impediments. The analysis is informed by structured desk research of real-time and lessons learnt evaluations of the Haiti response. The findings indicate that humanitarian decision-making in the Haiti case was most affected by the technical aspects of HIME, including accessibility, formatting inconsistency and storage media misalignment. In contrast, coordination was hampered when information flows were assigned very low priority and because humanitarian actors were unwilling to share humanitarian information with one another. The paper concludes with recommendations to address humanitarian information flow challenges and points up the need for accommodative revisions to the current structures and processes that guide HIME.

Information flows in humanitarian response

Information is a central element connecting all actors involved in humanitarian response. Indeed, remarkable improvements have been made to the information technology and communication infrastructure to facilitate better coordination and collaboration among humanitarian actors. However, gaps remain concerning the generation, analysis and dissemination of quality information before, during and after disasters. These gaps may be attributed to the nature of humanitarian response, which can be ideally conceptualised as a complex system. It is this perspective that grounds this analysis of the conditions affecting HIME.

Humanitarian response settings as complex systems

Complexity comprises the evolution of new structures and non-linear patterns arising from the inter-relationships and interconnectivity among and between elements located within a system and between that system and its environment (Prigogine,

1980). In complex systems, patterns of interaction are characterised by dynamism and are highly sensitive to initial prevailing conditions (Altay and Green, 2006; Celik and Corbacioglu, 2010).

Humanitarian response settings can be usefully understood as complex systems due to the fluidity of the post-crisis environment, the influx of actors producing an unregulated operating landscape, and the unpredictable impact of interactions between the complex system these actors come to constitute and the broader disaster response environment. Furthermore, the overarching trajectory established by humanitarian structures as they attempt to coordinate information flows between actors on the ground in a humanitarian emergency tends to crystallise around an initial set of conditions experienced in the immediate response phase. In other words, if information flows are affected negatively by impediments early on in a humanitarian response, overcoming those impediments becomes more and more difficult during later phases of the disaster response cycle.

Complex systems affect information flows within and among their units and sub-units, as well as in unit-level decision-making. They also influence levels of coordination within and across the system. Moreover, they shape overall effectiveness of the system in a given setting. These dimensions of humanitarian settings as a complex system are elaborated in Table 1 and discussed below. The article then introduces a framework featuring the role of information flow impediments in humanitarian settings, which grounds the analysis of the humanitarian response following the 2010 Haiti earthquake.

Humanitarian decision-making

Complexity creates an operational environment characterised by two central factors that affect decision-making: ambiguity and equivocality. In emergency response, information problems are common and generally involve assessing information quality, timeliness and relevance (Coyle and Meier, 2009). As uncertainty permeates complex humanitarian response systems, so too does the amount of information that must be processed by decision-makers to be effective (King, 2005; Rietjens, Voordijk and De Boer, 2007). When too much irrelevant or too little relevant information reaches humanitarian actors, decision-making is rendered extremely difficult if not impossible (OCHA, 2002). Moreover, while many emergency response settings feature

Table 1. Humanitarian settings as complex systems

Response dimension	Factors generated or affected by complexity
Humanitarian decision-making	<ul style="list-style-type: none"> • Ambiguity • Equivocality • Uncertainty • Sense-making
Humanitarian coordination	<ul style="list-style-type: none"> • Actual planning and preparation • Contingency and response scenario planning

Source: authors.

both a shortage and an overload of information, it is the lack of comprehensive, cross-functional, accurate and current information that most affects decision-making in disaster relief operations (Altay, 2008).

These factors can impede the development of operational and strategic frames of reference, which, in turn, diminish an actor's ability to literally 'make sense' of her environment, establish situational awareness and undertake informed decision-making (Muhren and Van de Walle, 2010; OCHA, 2006; Weick, 1985). In settings that lack frames of reference for sense-making, data and information are absolutely crucial to mitigate ambiguity and establish a clearer sense of the environment. In settings where too many frames of reference operate simultaneously, humanitarian actors will seek out more information to enable sense-making that reconciles contradictory or competing frames of reference. These actions are aimed at reducing equivocality, which perpetuates multiple and conflicting interpretations of 'what's going on' in a humanitarian response setting and thus impedes effective decision-making (Muhren and Van de Walle, 2010).

Humanitarian coordination

Coordination in humanitarian settings rests on the systematic utilisation of policy instruments to deliver humanitarian assistance in a cohesive and effective manner. Intergovernmental organisations such as the United Nations generally promote coordination via unified, linear and hierarchical structures, also known as 'systems' models, whereas NGOs tend to focus instead on more flexible and horizontally oriented processes and structures, also known as 'service' models of coordination (Schofield, 2002). Yet both the complexity of humanitarian response systems and the prevalence of incomplete information in these settings can still inhibit effective coordination under either model. For example, in complex systems, the effects generated by a decision taken at time t may differ greatly from those produced by the same decision taken at time $t+1$ (Celik and Corbacioglu, 2010).

Hierarchical or 'systems' coordination structures generally do not channel information flows effectively in complex settings because their rigid nature and lack of peripheral vision impede the ability of system actors to anticipate the unexpected (Marincioni, 2007). Rather, information flows vertically, not horizontally through this model, with field-level organisations:

feeding a system with information at the local crisis level, desk officers distilling [it] at a national, regional or headquarters level, and donor officials responding with policy decisions and funding at the international level (Schofield, 2002, p. 30).

Both types of coordination structures may be prone to experiencing information flow impediments under these conditions, but the service coordination model may be more capable of adapting to these constraints because the actors participating in it tend to operate with greater autonomy, are not 'contained within the system boundary, and do not necessarily have to "buy in" to the system in a specific way' (Schofield, 2002, p. 30).

Utilising information technology may enable the sub-units operating within complex systems to form communications networks that enhance information exchange and sense-making, while also facilitating decision-making and coordination (Celik and Corbacioglu, 2010; OCHA, 2007). At a minimum, the system's overall performance will be conditioned on whether and to what degree its sub-units have access to the same high-quality information (OCHA, 2006). When effective information flows among sub-units increase, the links between system components become stronger, which reduces ambiguity, equivocality and uncertainty.

Humanitarian system effectiveness

Humanitarian information flows generally operate via four related channels: within humanitarian organisations; between those organisations; from individuals to humanitarian organisations; and from humanitarian organisations to individuals (Sagun, Bouchlaghem and Anumba, 2009). The challenges of managing information in coordinating humanitarian relief differ from those encountered in commercial environments. In particular, the need for urgent response in conditions marked by extreme uncertainty and short operational life cycles represent features that are unique to humanitarian relief settings (Beamon and Kotleba, 2006; Tomasini and Van Wassenhove, 2004).

The inter-organisational flows of information in humanitarian relief networks are most closely associated with data collection (recording physical damage, needs, vulnerabilities and capacities); information processing (compiling data into a repository for knowledge management and resource allocation decisions); and information sharing (via a range of platforms, technologies and structures, whether one-to-one, one-to-many or many-to-one). When an actor's ability to carry out these operations is effective, actionable knowledge is created that consequently informs decision-making about resource flows (Day, Junglas and Silva, 2009).

Alongside these factors, humanitarian relief networks can be conceived of as temporary organisations or systems. They become hubs for human and material resources, information and other dynamics, much like those that normally exist across commercial organisations and forums (Smith and Dowell, 2000). In the case of an emergency setting, however, it is the disaster that establishes the specific configuration of a network. A case can be made, therefore, that the temporary nature of disaster relief increases the likelihood that special forms of information management are needed for them to function efficiently (Day, Junglas and Silva, 2009). In the immediate aftermath of a natural disaster, for example, new networks of organisations and structures emerge; the supply chains that undergird these networks are hastily established and are not typically comprehensive in scope or range (for example, they do not encompass all humanitarian actors operating in country or even within a particular sector). This has the effect of prohibiting greater systematisation of organisational exchanges and relationships—including those related to HIME.

Scholars have only lately begun to examine the effects of information flow impediments on humanitarian relief networks. Some studies identify information quality

Table 2. Information flow impediments and action/interaction strategies

Information flow impediment	Source	Action/interaction strategy
Inaccessibility	Inability to obtain data or information that is known or assumed to exist. Often caused by physical access constraints or when information systems are unprepared.	Revert to physical (non-technical) means of data collection.
Inconsistent information and data formats	Occurs when multiple sources of similar data or information cannot be compared or aggregated because of inconsistent classification, coding or definitions.	Collate dissimilar information, average or take the highest number in data range to ensure over- rather than under-compensation, and/or accept incongruent information.
Inadequate stream of information (shortage/ overload)	Too much or too little information is available. Large or clearinghouse relief organisations have demonstrated capacity and need to absorb vast quantities of data and information to serve others; smaller, client-based organisations tend to need less but more highly specialised information.	Rely on best assumptions if data or information is in short supply; if a data overload exists, expedite information processing.
Low information priority	Occurs when information flow processes are not taken into consideration by organisations collecting and processing data and information.	Separate and clarify roles and expectations specifically for HIME versus other response duties.
Source identification difficulty	Occurs when organisations lack knowledge about what information is needed and where to find it (unlike inaccessibility, which is related to an absence of information channels).	Deploy extra resources and clarify roles and responsibilities. Distribute policy guidelines widely and convey where mutual obligations exist, including which actors should gather what data and how to disseminate it.
Storage media misalignment	Involves organisational decisions regarding data storage and management formats. Affects levels of interoperability and cross-platform information retrieval. May be related to 'low information priority'.	Advance planning to ensure IT can be used reliably and adds value; Take decisions about storage well before data is aggregated and analysed electronically. Revert to traditional data collection if it saves time or if data is inaccessible, but improve the use of IT to expedite information processing and sharing, if possible.
Unreliability	Occurs when confidence levels about incoming and outgoing data reliability, as well as perceptions of data value, are low. In many cases, information is self-reported and unverifiable (for example, regarding shelter registration).	Leverage meaningful information only, try to correlate it with reliable data and, in some cases, simply accept that the quality of information (such as self-reported or crowd-sourced data) is going to be difficult to verify.
Unwillingness	Related to inaccessibility, but results mainly from lack of cooperation by other actors rather than the crisis operational environment itself. Information classified or restricted by an organisation can involve legal constraints (for example, data confidentiality for special populations such as minors, developmentally disabled persons or prisoners), or may simply be based on the preferences of a particular organisation.	Cultivate personal relationships and high levels of trust and liking in order to facilitate information sharing.

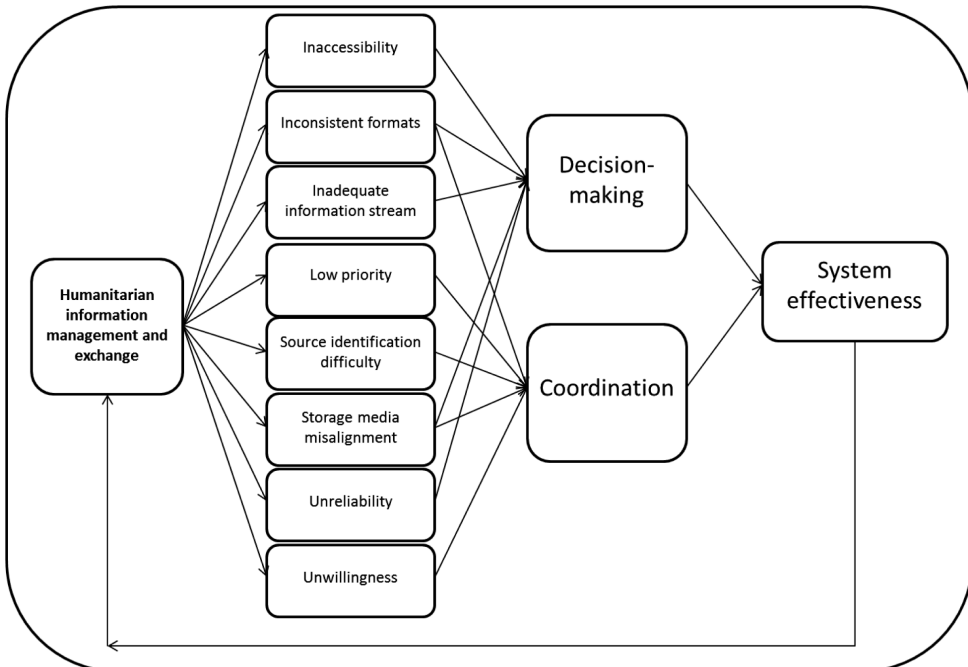
Source: Day, Junglas and Silva (2009).

(Fisher and Kingma, 2001), timeliness (De Bruijn, 2006) and an unwillingness to share (Ngamassi Tchouakeu et al., 2011), as well as misinterpretation, storage mismatch and information overload (Bui et al., 2000) as barriers to humanitarian information flows. Recent research, however, elaborates eight key information flow impediments commonly found in emergency settings (Day, Junglas and Silva, 2009). The impediments, their sources and possible solutions, are described in Table 2.

By combining the effects of complexity on humanitarian systems and the information flow impediments articulated by Day, Junglas and Silva (2009), the authors of this study have developed an integrated complexity–information flow impediment framework (see Figure 1). They argue that information flow impediments play a moderating role between HIME and the two response dimensions affected by humanitarian system complexity.

The authors determined which impediments moderate which of the two dimensions by inferring decision-making as being an action of a single agency while coordination involves synchronised actions of two or more agencies. Thus, a humanitarian agency that finds data inaccessible, inadequate or unreliable will have difficulty in decision-making. On the other hand, for two or more agencies to act together, they need to communicate clearly with each other. If, however, information sharing is accorded a low priority, or if agencies are not willing to share information or they cannot identify the source of the information, then they cannot synchronise their actions. Finally, inconsistent data formats and storage media misalignment would affect

Figure 1. Integrated complexity–information flow impediment framework



Source: authors.

both a single agency's decisions as well as multiple agencies' coordination, and therefore they are shared impediments between the two factors of system effectiveness.

Agency reports on response effectiveness, lessons learnt reports and research such as this study all provide feedback as to what works and what does not in HIME. The following sections utilise this integrated framework to analyse the humanitarian response to the 2010 Haiti earthquake and to draw conclusions related to humanitarian decision-making, coordination and overall system effectiveness.

Data and methodology

This examination of the impact of information flow impediments on the humanitarian response in Haiti is based on a fine-grained analysis and a desk review of 27 evaluations, lessons learnt reports and mission reports, compiled between February 2010 and May 2011 by the Active Learning Network for Accountability and Performance in Humanitarian Action, or ALNAP.⁴ Many were conducted in 'real time' or within the first six months following the earthquake (see Annexe 1). This time frame is appropriate insofar as an analysis of information flows is concerned, given how the complexity created by symmetry-breaking events, such as earthquakes and the initial conditions they spawn, ultimately crystallise the trajectory of HIME. The reports were authored or commissioned by 25 different humanitarian actors, including UN agencies, international and national NGOs, government donors, private foundations and for-profit enterprises. They are rich in empirical evidence and statistical data, enabling a close analysis and identification of linkages between information flow impediments, their effects and, in some cases, how information impediment challenges were overcome.

The first step in this analysis involved ensuring author consensus on the meaning and content of the eight information flow impediments. The authors then independently read each report, identified every instance where one or more of the impediments listed in Table 1 were experienced and recorded their related consequences. These lists were exchanged between the authors and were reviewed closely for consistency. In cases of conflicting views, the authors attempted to norm their findings by discussing how to record that particular impediment. If no consensus was reached that particular case was eliminated from the list of incidents. If evidence related to a particular information flow impediment was located across multiple reports, it was aggregated into a broader narrative. If evidence was slight or only confirmed through a single report or document, it was not deemed to be substantial enough to warrant full confirmation of an impact.

Evaluations are defined as the 'systematic and impartial examination of humanitarian action intended to draw lessons to improve policy and practice and enhanced accountability' (Haver, 2011, p. 8). They are generally commissioned by or in conjunction with an organisation whose work is being evaluated. Evaluations are conducted by independent consultants or a mix of consultants and staff from the commissioning

organisation, the organisation being evaluated or both; use recognised criteria as the basis of the evaluation (such as the criteria developed by the Development Assistance Committee of the Organisation for Economic Co-operation and Development); and establish findings, conclusions and recommendations that are disseminated widely.

On the basis of the range of publicly available evaluations published during the period under study, the sample reflects both Western and international NGO bias. It may also reflect a self-selection effect, as only institutions willing or required (such as by external donors) to publish evaluations did so in the Haiti case. In addition, many evaluations were selective in scope, focusing on specific programmes and projects. Very few were undertaken jointly—the CARE–Save the Children evaluation being one exception—and only a handful were system-wide, such as evaluations by OCHA and the Inter-Agency Standing Committee.

Moreover, it is important to note that the humanitarian system has not endorsed a common standard for assessing humanitarian performance (Haver, 2011). Thus, this analysis does not determine how effective the humanitarian community's response was in Haiti. Rather, the goal is to assess whether and how information flows may have contributed to variations in effectiveness across sectors and clusters, along the two humanitarian response dimensions articulated in Figure 1. To do so, the authors pooled the information contained in the various evaluations to determine where information flow impediments operated across various sectors represented by humanitarian clusters. Adapting the empirical evidence to the analytical framework in Figure 1 yields a picture that highlights the implications of those impediments on decision-making and coordination—and, consequently, on system effectiveness. The following section utilises the information flow impediments identified by Day, Junglas and Silva (2009) to examine how these impediments affected the humanitarian response in the aftermath of the 2010 Haiti earthquake.

Information flow impediments in the disaster response

Within the first 48 hours following the 2010 Haiti earthquake, OCHA mobilised the cluster approach and, within three weeks, all clusters were functional.⁵ However, the quality and impact of cross-cluster response was limited by the vastness of the disaster setting; the influx of unregulated and often inexperienced humanitarian actors with little capacity; the failure to adapt to the urban context of the disaster or partner effectively with national and community-based actors; and ineffective leadership at the global level. Staff turnover was extremely high and leadership capacity remained low during the initial emergency response phase, including in the area of information management (Taylor et al., 2010).

OCHA expedited dedicated HIME staff and significant resources to Haiti.⁶ These had a range of impacts on the overall humanitarian response, both within and across clusters. Yet some of the cornerstone information management resources of the cluster approach—such as the Who does What Where (3W) database and OneResponse (now Humanitarian Response)—were not effective, were not perceived as being value-

added and were underutilised.⁷ Instead, humanitarian actors devised alternatives to capture the information and data needed for decision-making, coordination and implementation. OCHA did not revise its HIME strategy during the first year of the Haiti response, and over time its contribution in this area was diminished. Perhaps most importantly for the purposes of this analysis, the response to identified needs was often delayed—and, in some cases, inappropriate responses were undertaken—and decision-makers were frequently left in positions of having to act without vital information (Bhattacharjee and Lossio, 2011; Grünewald and Binder, 2010; Taylor et al., 2010). The following sections examine the ways in which information flow impediments affected humanitarian decision-making and coordination.

Impediments to humanitarian decision-making

Figure 1 identifies five impediments to information flow that hinder humanitarian decision-making: inaccessibility; inconsistent data formats; inadequate information streams; storage media misalignment; and unreliable information. The authors found that in the Haiti response no single factor emerged as having the most significant impact on decision-making. In general, decisions had to be made, even where ambiguity and equivocality prevailed. However, the evidence suggests that the quality and reliability of data being used for decision-making were closely linked to how they were gathered and stored as well as whether and to what degree they could be accessed by humanitarian actors on the ground.

Access to relevant information was initially difficult simply because mobile phone systems stopped working immediately following the earthquake, although the Internet continued to be accessible, albeit intermittently. Consequently, information circulated mainly via international news networks such as CNN (Grünewald and Renaudin, 2010). However, problems related to information access were also encountered in cluster meetings, which were conducted in English. This had the effect of excluding non-English speaking humanitarian actors, including many national NGOs. Moreover, access to these meetings, held at the logistics base of the UN Stabilization Mission in Haiti (MINUSTAH), was tightly controlled and involved long and frequently difficult travel from other parts of the city due to debris and road conditions. Many local humanitarian and civil society actors were thus unable to participate (Bhattacharjee and Lossio, 2011; DARA, 2010).

Similarly, the lack of access to areas outside the capital and even to areas within Port-au-Prince meant that data collection was stymied in the initial phase of the response. This affected decision-making in crucial clusters such as the water, sanitation and hygiene (WASH) cluster, whose equipment acquisition was inadequate because ‘the Civil Protection bodies did not have information about access to water in Port-au-Prince, including its physical characteristics and the way it is managed’ (Grünewald and Renaudin, 2010, p. 24).

In situations where access to information was relatively unproblematic, decision-makers were often presented with data that had not been collected, defined or compiled using uniform assessment standards or definitions (Taylor et al., 2010). For

example, key concepts such as ‘displacement’ and ‘affected/non-affected populations’ were subject to multiple interpretations depending on who was gathering the information. This may have rendered the data less reliable and, therefore, less useful in decision-making (Rencoret et al., 2010).

Inadequate information streams (including shortages and overloads) also affected humanitarian decision-making in the Haiti case. For example, mobile phone networks would go down for hours at a time as the result of the volume of SMS messages coming in from humanitarian staff. According to one estimate, SMS messages were ‘flowing’ only 60–70% of the time and no back-up systems were in place (Nelson and Sigal, 2010). Thus, when a cellular network shifted to ‘sleep’ mode, SMS messages would be held in limbo, only to be unfrozen when the network returned to normal mode. This inevitably resulted in an overwhelming data rush, leaving humanitarian workers with a distorted sense of their environment, as well as ambiguity and equivocality.

Inadequate information streams also affected decision-making in specific clusters. For example, the child protection sub-cluster lead agency, the United Nations Children’s Fund, noted that ‘underreporting’ was common among its partners and thus complicated effective decision-making and programming (UNICEF, 2010, p. 33). In the WASH cluster, the ability of the British Red Cross to take decisions was constrained by the lack of documentation justifying and explaining past decisions. This created challenges for ‘maintaining continuity between rotations, for the transition into the long-term response to sanitation needs, and for the evaluation’ (DRLA, 2011, p. 20; Fortune and Rasal, 2010, p. 26).

Storage media misalignment also affected humanitarian decision-making. One such example concerns the dissemination range of emergency data compiled by the crowd-sourcing platform Ushahidi, which was delimited to humanitarian actors with the most up-to-date hardware and software. For some NGOs, Internet communication security policies prevented access to Ushahidi’s website and data streams (Morrow et al., 2011). As one informant from DARA, an independent humanitarian organisation committed to improving the effectiveness of humanitarian aid, described it, many information systems were Internet-based, which might be ‘sexy, but doesn’t necessarily work’ in an environment where the mismatch between the way data was stored and one’s ability to access it was so glaring (DARA, 2010, p. 164).

A final information flow impediment for decision-making in the Haiti case was unreliability. For example, Rapid Initial Needs Assessment for Haiti (RINAH) was the first of ten multi-sectoral needs assessments conducted. From 25 January to 6 February 2010, information on shelter and non-food items; water, sanitation and hygiene; food security and nutrition; health and health facilities and cross-cutting issues was collected (Rencoret et al., 2010, p. 25). However, release of this information was delayed due to a variety of reasons. Despite its \$3 million price tag—which covered 128 staff, 23 helicopters and 51 vehicles—the data that was finally disseminated was outdated, had limited value and was thus deemed unreliable by humanitarian actors (Grünwald and Renaudin, 2010; Rencoret et al., 2010, p. 25). Following the RINAH debacle, each sector conducted its own needs assessments.

A lack of timeliness was not the only reason agencies considered information unreliable. For example, the initial GPS coordinates provided to the US Air Force chief medical officer by the US Embassy turned out to be inaccurate (Nelson and Sigal, 2010). Other actors attempted to make decisions using data gathered through more innovative methods, such as crowd-sourcing, but they remained sceptical about levels of reliability since such information was almost entirely self-reported and non-verifiable (Morrow et al., 2011). Similarly, many questioned the reliability of the data in OCHA's 3W database precisely because it was not gathered independently by OCHA staff (DARA, 2010). Another widespread concern revolved around corruption among national and community actors who sought to co-opt humanitarian aid resources, with the result that many humanitarian organisations simply did not trust survey data that they had not gathered themselves (Rencoret et al., 2010).

Impediments to humanitarian coordination

Based on the integrated framework presented above (Figure 1), coordination among humanitarian agencies can be hindered by the following information flow impediments: inconsistent data formats; storage media misalignment; source identification difficulty, low priority and an unwillingness to share information. Across the Haiti response evaluations, the evidence suggests that coordination appears to have been most affected by a widespread unwillingness to share information—and by low information priority.

In a number of instances, potentially valuable information and data were not managed sufficiently to facilitate effective coordination among humanitarian actors. All too often, different actors used different measurements and definitions in data collection and analysis. This reinforced the hierarchical model of coordination, which enabled coordination between the country and global-level clusters, but did little to enhance coordination among or within clusters at the country level. For example, the Clinton Foundation collaborated with Haiti's Ministry of Health to establish a national registration system, but it used different data gathering formats and standards than those used by the health cluster (DARA, 2010). Similarly, needs assessment reports in the early stages of the Haiti response followed different standards, methods and focuses, thereby hampering efforts to create an overview of cross-cluster needs and coordination approaches (IASC, 2010).

Storage media misalignment also posed challenges to coordination, and no settled consensus emerged regarding how to manage it. The dynamic event data aggregated by groups like Ushahidi, for example, was not fully integrated into coordination mechanisms because it did not align with the specific and rigid information requirements of traditional organisations, including larger NGOs and the United Nations (Morrow et al., 2011; Nelson and Sigal, 2010). Certain clusters began utilising Google Groups and Google Docs to coordinate their programming, rather than using OCHA's OneResponse website (DARA, 2010). Some humanitarian actors argued that the humanitarian response would have been more efficient had organisations simply relied on old-school coordination tools such as Excel spreadsheets rather than whistle and

bell-laden, Internet-based systems (DARA, 2010; Bhattacharjee and Lossio, 2011). Others faulted this approach, noting that tools such as geo-mapping—that is, data integrated into digital maps—could not aid in coordination because it was incapable of capturing the fluidity of population movements in and around Port-au-Prince (UNICEF, 2010).

Evidence of unwillingness to share information also prevailed in the Haiti response. For example, OCHA developed a contingency planning process in March 2010 to identify all contingency stocks held by all agencies operating in the country. Yet agencies complained that the surveys administered were complicated, required highly detailed knowledge and were difficult to complete and return. Very few participated in the assessment and, by September, the process was largely abandoned (Bhattacharjee and Lossio, 2011). Unwillingness of humanitarian actors to share information also caused overlaps and redundancies. Some organisations simply did not feel the need to coordinate or share information, especially those with their own unrestricted funding. Consequently, agencies and actors working on similar programmes remained largely unaware of what others were doing (O'Hagan, 2010).

Arguably, the most significant information flow impediment affecting coordination in the Haiti response was low information priority. The Inter-Agency Standing Committee, for example, found serious delays in:

compiling and sharing comprehensive data on the number, location, and activities of humanitarian organisations, and on sectoral needs, coverage and gaps. Delays can be attributed, in large part, to a lack of willingness by agencies to prioritize reporting on activities, particularly in the initial stages of the response (IASC, 2010, p. 24).

In specific clusters, such as WASH, many organisations lacked critical knowledge concerning traditional sanitation habits and the customs associated with drinking water procurement, reflecting low levels of engagement with local communities and the low priority given to this information. Thus, approaches to manage these issues were ineffective, including the building of standing latrines and the distribution of free water (Fortune and Rasal, 2010; Clayton and Davies, 2011).

Many organisations disregarded the imperative to gather key information in order to respond to the sheer scope of the disaster's aftermath. For example, Médecins Sans Frontières noted that data collection had to take a backseat to immediate action to save lives (MSF, 2011). No records were kept of the type or nature of the injuries that characterised the 800-plus cases its staff managed in the first three days following the quake. Similarly, British Red Cross staff claimed they did not have time to undertake monitoring activities and that the lack of baseline data rendered monitoring useless in any case (Fortune and Rasal, 2010). In some camps, humanitarian actors failed to carry out initial registration procedures for the displaced. Beneficiaries were not prioritised according to need, such that pregnant and breastfeeding women as well as the disabled were treated like everyone else, based on the argument that virtually everyone had similar needs. This approach rendered developing a targeted and coordinated response almost impossible. When registration was later conducted, no standard protocols were used (Johnson, 2010).

Similarly, some assessment teams simply assumed that no local capacity existed in Haiti, that security was tense and unstable, and that the displaced were mainly located in the camps. Yet none of these assumptions proved to be true (Grüneward and Binder, 2010; UNICEF, 2010). Moreover, the Haiti disaster was urban but little attention was paid at the outset to rural communities, which hosted most of those who had fled Port-au-Prince. The needs of many of these communities simply fell off the radar screens of many agencies, even those that had worked in rural Haiti on development projects prior to the earthquake (O'Hagan, 2010).

Because local institutional knowledge was accorded such low priority, valuable information was not integrated into decision-making or coordination (Grüneward and Binder, 2010). For example, early decisions about coordinating the displacement response were based on what humanitarian actors knew how to do, not what the best approach should be given the local context and the complexity of the humanitarian response environment (O'Hagan, 2010). Data and information were being gathered for a classic humanitarian response that was self-contained, with national authorities on the margins, providing services that were imported and driven mainly by expat, international staff; an approach that prioritised community-based information might have yielded more effective coordination (Taylor et al., 2010).

The nutrition cluster, for instance, realised that the norm of breastfeeding was being negatively affected by the distribution of certain food and non-food items by other clusters and their implementing partners. It carried out a mapping exercise to determine the scope of breast milk substitutes that were forming part of relief packages, including infant formula, milk products, bottles and teats (UNICEF, 2010). Yet these items continued to be distributed to local populations despite the dissemination of new information and knowledge about the possible damaging impact of these programmes on local norms and behaviours.

Overcoming information flow impediments in humanitarian response settings

Three years after the Haiti earthquake, hundreds of thousands still live amid the rubble in Port-au-Prince and across the nearly 500 camps and settlements (Sontag, 2012). A number of humanitarian organisations have scaled back their programmes and field presence, while many others have departed from Haiti altogether (Booth, 2011). Despite numerous appeals for a more concerted leadership and coordination effort, the humanitarian response in Haiti has not turned out to be one of the humanitarian community's proudest moments.

The Inter-Agency Standing Committee's second-phase evaluation of the cluster approach concludes that information management remains a big problem (Steets et al., 2010). Information flow impediments have played a role in the underperformance of the humanitarian system in Haiti. Ineffective HIME strategies affected decision-making and impeded national and local capacity building. They obstructed coordination and obscured the interactive nature of decisions taken in complex humanitarian

systems. Indeed, a recurring theme throughout the evaluations used in this study was the unwillingness of international humanitarian actors to match rhetoric with reality regarding participatory approaches to information sharing and exchange. Many Haitians felt that their local knowledge, initiatives and capacities were largely ignored by the international community. While difficult to demonstrate scientifically, there is ample anecdotal evidence to suggest that the lack of meaningful consultation with local stakeholders has negatively affected the humanitarian system's effectiveness in Haiti. By any stretch, the response was not tailored to local needs, leaving many communities deeply frustrated and marginalised (Grünewald and Binder, 2010; Johnson, 2010; O'Hagan, 2010; Rencoret et al, 2010).

In considering ways forward, this study offers three recommendations based on this analysis. Each of the three holds the potential to facilitate more effective HIME approaches in humanitarian emergency response.

Do not allow the perfect to be the enemy of the good

For OCHA to build a more effective HIME response, one that enhances decision-making and coordination, it must remain agile and adaptive to changes on the ground in complex emergency settings such as Haiti (Bhattacharjee and Lossio, 2011). Coordination must centre on the knowledge that the setting is complex and produces interaction effects that should be studied carefully and for which contingency planning is key. Therefore, needs assessment tools should not be implemented if the process and dissemination is expected to take so long that the information value is diluted and considered unreliable by users. In other words, placing a premium on getting information flows 'right' may come at the expense of timeliness of dissemination so decisions can begin to be taken and opportunities for coordination can be explored. Some evaluators of the Haiti response have recommended, for example, that OCHA develop the capacity to conduct multi-sectoral (or cross-sectoral) analyses and distribute its results, even if imperfect, in a far more timely manner than was the case in Haiti as a means of improving the quality and effectiveness of information sharing (Grünewald and Binder, 2010).

HIME must be perceived as value added or it will not be utilised

While hindsight may reveal that OCHA's information in the Haiti response was only as good as the data it received, the findings of this study indicate that humanitarian actors did not accord high value to the data available to them. Moreover, when humanitarian actors go elsewhere to obtain information, it is a clear sign that the information OCHA is providing is not perceived as valuable. By following a supply-driven orientation rather than a demand- or needs-driven orientation for information sharing, the cluster approach may not only be contributing to humanitarian under-performance (thereby inhibiting decision-making), but may also be denigrating its ability to enhance humanitarian coordination among and within clusters. A number of Haiti observers have argued that OCHA information has been useful mainly to

international donors and the UN Secretariat, but not to field-level humanitarian staff or even the Humanitarian Coordinator (Bhattacharjee and Lossio, 2011).⁸

In addition to being perceived as value added, humanitarian information can only enhance humanitarian response effectiveness if it is perceived as reliable. As this analysis demonstrates, information flow impediments associated with quality and validity can exacerbate ambiguity and equivocality in humanitarian settings and make effective decision-making highly difficult. The dimensions of information quality in the humanitarian context must be more fully understood in order to advance and evaluate effective information gathering and processing (DeLeone and McLean, 1992; Wang and Strong, 1996).

There are at least two ways to do this. First, HIME can and should be designed specifically to deal with incompatible and unverifiable data, especially if the use of metadata is streamlined into data collection during humanitarian emergencies (Day, Junglas and Silva, 2009). Second, HIME system design also needs to support ‘how people make sense of their environment’ and not simply be devoted to analysing and processing information for information’s sake. As noted by Weick (1985), without capturing the social facet of sense-making, information systems and representations in the electronic world can foster more chaos than order. Often flawed and incomplete, electronic data tends to be managed by individuals who have a finite and limited processing capacity. Sensory information—such as context and emotive signals—are necessary for accurate perceptions of one’s environment and are forms of knowledge that cannot be captured by machines or data. In cases where HIME systems avoid integrating these woolly dimensions of data into broader repositories of knowledge, decision-making and coordination will be ineffective.

HIME should accommodate permeability, ownership and integrators

Technological advancements in HIME are not a panacea for generating effective humanitarian response. Corollary factors such as the professional culture of and regulatory behaviour among humanitarian organisations, donor structures, the role of the media and civil–military interaction are also relevant (Balcik et al., 2010). These factors all have an impact on information flows in humanitarian response; while they were not the direct focus of this analysis, the presented evidence points up these issues in an indirect, but nonetheless significant manner. Developing an accommodative approach may well help raise the profile of humanitarian information and create positive buy-in to the process on the part of humanitarian actors, thus enhancing overall system effectiveness. It rests on three interrelated features: permeability, information ownership and information integrators.

In humanitarian response settings defined by complexity, the system’s performance is dependent on the sum of interactions within and between its units and sub-units; it can usefully be explored through the concept of ‘permeability’ (Brown, 1966). Referring to the flow of both people and information across organisational boundaries of the units that constitute a system, permeability is reflective of their norms, values and cultures. Humanitarian actors have highly *permeable* boundaries because there are few barriers to the movement of individuals and information in and out of

these organisations (Katz and Kahn, 1966). UN agencies, on the other hand, have highly *impermeable* boundaries, tend to be bureaucratised and follow elaborate norms and rules, as well as standardised operating procedures concerning HIME and personnel management.

While high permeability may be ideal for operational deployment flexibility and timely response, it can hinder organisational learning and institutional memory in complex systems. This is especially true of data collection and information analysis that are carried out by multiple actors with no common set of guidelines or principles to guide their work. If a closer balance between levels of permeability between the types of actors involved in humanitarian response cannot be attained, coordination will likely remain sub-optimal and its perceived value to humanitarian response will be fleeting (Maitland, Ngamassi Tchouakeu and Tapia, 2009; ICVA, 2010; Sagun, Bouchlaghem and Anumba, 2009).

Related to permeability is the notion of information ownership. The humanitarian response landscape prior to the establishment of the cluster approach was characterised mainly by voluntary, informal, lateral modes of coordination, particularly among field-level actors. This has made establishing effective information flows, decision-making and coordination extremely difficult. To help resolve this dilemma, OCHA has been assigned the role of ‘owner’ of humanitarian organisational memory. It is a fitting role for the organisation, as information owners should be ever present in every disaster and interact with the other units and sub-units, thus contributing to the system’s overall goals. To raise the priority given to HIME and positively induce information sharing in humanitarian settings, however, other corollary roles need to be established and accorded to other humanitarian actors. OCHA could, for example, experiment with officially designating cluster co-lead organisations as information co-owners. To some degree this is already occurring on the ground, particularly where clusters organise their own information-sharing platforms outside the OCHA structure.

Finally, the coordination modes that prevail among the sub-units of a humanitarian response system may occur by default or design, but they are often facilitated by actors within the system who are known as ‘integrators’. Cultivating a visible role for integrators could well help humanitarian organisations overcome their unwillingness to engage in HIME. Effective integrators (1) possess wide contacts in an organisation; (2) hold a reasonable understanding of the goals and orientations of different groups that constitute the organisation; (3) have a broad technical view to be able to talk the language of different sub-units; (4) are trusted by the sub-units; (5) exert influence on the basis of expertise rather than through formal power; and (6) possess conflict resolution skills (Lawrence and Lorsch, 1967). Integrators can be particularly helpful in complex systems where the units and sub-units have differing structures, missions, goals, capacities and experience.

Complex emergencies such as the 2010 Haiti earthquake are likely to characterise the humanitarian response landscape for the foreseeable future, as are the information flow impediments examined in this study. Growing recognition of the importance of HIME in facilitating effective decision-making, coordination, and response is noteworthy, but there is considerable room for improvement in both the design and substance of its constitutive structures and processes.

Annexe 1. 2010 Haiti earthquake evaluations (based on 27 reports as of 30 May 2011)

Commissioning organisation	Title	Date
Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP)	Haiti Earthquake Response: Mapping and Analysis of Gaps and Duplications in Evaluations	February 2011
	Haiti Earthquake Response: Context Analysis	July 2010
American Council for Voluntary International Action (InterAction)	Monday Developments Magazine—Haiti: One Year of Recovery	January 2011
British Red Cross Society	British Red Cross—Mass Sanitation Module: 2010 Haiti Earthquake Response—Post Development Learning Evaluation	August 2010
CARE International and Save the Children Fund	An Independent Joint Evaluation of the Haiti Earthquake Humanitarian Response	October 2010
Catholic Relief Services (CRS)	CRS Haiti Real-time Evaluation of the 2010 Earthquake Response	March 2011
Christian Aid	Real-time Evaluation of Christian Aid's Response to the Haiti Earthquake	July 2010
Communicating with Disaster Affected Communities (CDAC)/ John S. and James L. Knight Foundation	Media, Information Systems, and Communities: Lessons from Haiti	May 2010
DARA International	DARA Crisis Reports: Haiti	December 2010
Disasters Emergency Committee (DEC)	Urban Disasters: Lessons from Haiti	January 2011
European Community Humanitarian Office (ECHO)	Beyond Emergency Relief in Haiti	January 2011
French Ministry of Defence/Groupe URD	Real-time Evaluation of the Response to the Haiti Earthquake of 12 January 2010	April 2010
Handicap International	Nine Months of Action by Handicap International	October 2010
	Six months of Action by Handicap International	July 2010
Médecins Sans Frontières	Haiti: One Year After—A Review of Médecins sans Frontières' Humanitarian Aid Operations	January 2011
Norwegian Agency for Development Cooperation	Norwegian Humanitarian Response to Natural Disasters: Case of Haiti Earthquake January 2010	March 2010
Oxfam International	Haiti Progress Report 2010: An Overview of Oxfam's Humanitarian Response to the Haitian Earthquake	January 2011
Tearfund	Real-time Evaluation of Tearfund's Haiti Earthquake Response	May 2010
Tulane University, University of Haiti	Haiti Humanitarian Aid Evaluation	January 2011
United Nations Children's Fund (UNICEF)	Children of Haiti: Three Months after the Earthquake	April 2010
	Children in Haiti: One Year After—The Long Road from Relief to Recovery	January 2011

UN Inter-Agency Standing Committee (IASC)	Response to the Humanitarian Crisis in Haiti following the 12 January 2010 Earthquake	July 2010
	Inter-Agency Real-Time Evaluation in Haiti: 3 Months after the Earthquake (carried out by Groupe URD and Global Public Policy Institute)	August 2010
UN Office for the Coordination of Humanitarian Affairs (OCHA)	Evaluation of OCHA Emergency Response to the Haiti Earthquake	January 2011
Ushahidi	Independent Evaluation of the Ushahidi Haiti Project	January 2011
World Bank	The World Bank Group Response to the Haiti Earthquake: Evaluative Lessons	January 2010
World Vision	Haiti One Year On: Haiti Earthquake Response	January 2011

Source: authors.

Correspondence

Nezih Altay, Department of Management, DePaul University, 1 E. Jackson Blvd., Suite 7000, Chicago, IL 60604, United States.

Telephone: +1 312 362 8313.

E-mail: naltay@depaul.edu.

Endnotes

- ¹ For example, as one anonymous reviewer insightfully remarked, data from Haiti's National Centre of Statistics, which had been rescued from the rubble and stored with the United Nations Population Fund, was available for use. Yet newcomers to the humanitarian response assumed there was no data and did not attempt to look for any.
- ² The cluster approach is the UN's humanitarian coordination and response structure. For more information on the approach in general as well as on individual clusters, see OCHA (n.d.a).
- ³ This assertion paraphrases remarks made by Hansjoerg Strohmeyer, chief of OCHA's Policy Development and Studies, to participants in the 34th International Diploma on Humanitarian Assistance in New York on 15 June 2011.
- ⁴ ALNAP is one of the primary repositories for humanitarian evaluations as well as other resources pertaining to best practices, lessons learnt and accountability in humanitarian response.
- ⁵ OCHA originally implemented the cluster approach in Haiti in 2008. The first clusters to be mobilised following the 2010 earthquake were food; water, sanitation and hygiene; health; shelter and non-food items; and logistics.
- ⁶ Four of OCHA's 22 staff and nine members of the United Nations Disaster Assessment and Coordination (hailing from MapAction) worked solely on information management (Bhattacharjee and Lossio, 2011).
- ⁷ For more information on 3W, see OCHA (n.d.b). Humanitarian Response is a collaborative inter-agency website designed to enhance humanitarian coordination within the cluster approach. See HumanitarianResponse (n.d.).
- ⁸ This point was also communicated to the co-authors during a telephone interview with senior humanitarian staff serving with a major international NGO in Haiti during 2010–11.

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