Building global bridges: Coordination bodies for improved information sharing among humanitarian relief agencies

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ABSTRACT

Information is a critical component to improved inter-agency coordination during disaster response. Coordinated information and communication technologies deployments as well as coordinated information management processes are important tools in the provision of this information. However, multilateral agency coordination faces many challenges, which has sparked the formation of *coordination bodies*. This research examines three such bodies and describes their organizational arrangements as well as identifies common challenges they face to effective coordination. It finds that the bodies differ on a variety of dimensions including funding mechanisms, autonomy, and number of members, which will likely have implications for the strategies they employ. Also, the coordination bodies identify a lack of standardization, capacity and information availability and analysis as challenges to improved coordination.

Keywords

ICT, humanitarian, coordination, collaboration, cooperation, coordination bodies.

INTRODUCTION

Calls for improved coordination among organizations during humanitarian relief operations, for which information is a crucial ingredient, have led humanitarian assistance organizations to carefully consider how and when they share information. Their initial examinations have found that improved coordination will require coordinated information management as well as coordinated deployments of information and

communication technologies (ICTs). And while a diagnosis of the problem is an important first step, the solution can be daunting. In particular, effective disaster response require continuous coordination among a large number of organizations, rather than simply one time initiatives. To resolve the problem of multilateral coordination a number of so-called *coordination bodies* have emerged. However, the extent to which these bodies have been able to facilitate coordination is unclear as are the reasons for their success or failure.

Given the relative young age of these organizations it may be too early to proclaim success or failure, however much can be learned about them by understanding their similarities and differences and what they perceive to be the important issues for achieving coordination. To this end, this paper examines three such coordination bodies. The goal of the examination is to understand the extent to which organizational characteristics such as structure, number of members and funding influence outcomes as well as what they see as the critical priorities for facilitating coordination.

The paper begins with a general discussion of the challenges of ICT coordination in a humanitarian relief context as well as a discussion of the differences between collaboration, coordination and cooperation in this domain. Next three case studies of coordination bodies are presented, followed by an analysis and identification of common priorities among the bodies. The paper closes with a discussion of the implications of these findings.

COORDINATION OF ICTS IN THE HUMANITARIAN RELIEF SECTOR

Coordination of information management processes and the ICTs that support these processes gives rise to many challenges, including those related to the inter-organizational context, to the non-profit context and to the emergency response context.

The challenges to inter-organizational ICT deployments include the need for systems integration, both across organizations and within organizations across legacy systems and between the field and headquarters. The challenges of coordinating in the humanitarian relief domain arise in part due to differences in funding bases and organizational goals, professional and organizational status hierarchies, and the tendency of each organization to try to maximize its own autonomy (Tierney, 1985). Further, growing numbers of international humanitarian assistance organizations exacerbate the problem, making coordination even more complex and in some cases delaying or decreasing the efficiency of services (Kreps and Bosworth 1994; Middleton and O'Keefe 1998; Paton, Johnston and Houghton 1998). Increasing numbers of agencies also increases the complexity of humanitarian assistance networks, and research has found that network structure and composition have implications for relief results (Trainor 2004; Moore, Eng and Daniel 2003; Benini 1999).

While increasing numbers of agencies can pose challenges to coordination, the inherent interdependencies can also facilitate coordination. Empirical studies have found that informal contacts, good historical relations with other organizations, common commitment, existence of common language, accessibility to other organizations, professionalism, standardization, structural similarities, scarce resources and frequent external communications all serve to enhance coordination efforts (Alexander, 1995; Bui et al., 2000). Our own research on inter-organizational coordination in the area of ICTs for relief reflects these more general findings, and in particular found that NGOs' top three motivations for working with another agency were (i) mission (ii) to fulfill a resource need and (iii) prior experience in cooperation (Maitland, 2005).

Further, once partners have been identified, the challenges of designing and maintaining systems must be addressed. Sustainability of coordinated ICT projects requires that the system is maintained and upgraded beyond the initial design, development and implementation stages and that in some cases the system is flexible enough to respond to changing client needs. These issues must be considered from the outset, realizing that if no partner is willing to take long-term responsibility for the system, it might not be worth building in the first place.

In addition to the organizational divide, information management processes and ICT deployments must also cross the intra-organizational headquarters/field divide. Distributed organizational structures as well as headquarters/field role conflicts present significant challenges to ICT deployment and usage among

humanitarian organizations. Even the most sophisticated technology cannot solve the conflict of knowledge and authority, where field staff understand the local conditions and constraints and frequently know what needs to be done, but infrequently have the authority to do so. Conversely, staff at headquarters are given the power to act but lack an understanding of what is happening on the ground (Suparamaniam and Dekker 2003).

In addition to the (inter-)organizational context, ICT deployments for humanitarian relief must also contend with the non-profit context. In this context ICTs are supposed to meet the direct needs of clients rather than improving the efficiency of service providers. One reason for this emphasis is donor demands that require significant portions of donations be spent directly on victims and overhead expenses, including IT, to be kept to a minimum. An additional consequence of this pressure is that agencies pay lower wages or use volunteer staff who generally are less skilled and more transient, both of which present challenges to systems development and information gathering (Corder 2001; Bui, Cho, Sankaran, et al. 2000).

Natural and man-made disasters create physical challenges for ICT deployments and information management as well. Issues include a lack of fixed infrastructure, poor or non-existent transportation, lack of power, and exposure to weather (lack of structures). Further, politics may limit access to victims (Taylor-Robinson 2002; Munslow and Brown 1999), and increased information flows resulting from ICT use may represent a threat to the government (Knuth 1999).

COORDINATION & COLLABORATION IN HUMANITARIAN ICT

While the above section makes no clear distinction between the concepts of collaboration, coordination and cooperation, the subtle differences between them reflect differing levels of commitment to joint design and deployment of ICT and information management systems. Hence this distinction is important for our understanding of forms of coordination in humanitarian relief coordination bodies and therefore the following definitions of collaboration, coordination and cooperation are used.

Cooperation between organizations usually manifests as a primarily verbal dialogue and takes place in informal settings. An organization can present a need that another organization could satisfy without a formal contract or agreement (Hord, 1986). A typical scenario of this type of interaction takes place at the field level, when staff from different NGOs share resources (i.e. online time), skipping any formal procedure. Cooperation activities generally do not interfere with the autonomous programs of the participants. Hence, there are no risks or loss of independence with this kind of agreement (Mattesich, Murray-Close, & Monsey, 2001).

Coordination is more formal than cooperation. It can be considered as a step toward further and more enhanced cooperation. It takes place when organizations find that their individual goals are similar, so they can work together on "their separate, yet compatible, missions" (Czajkowski, 2007, p. 2). Organizations are more involved in the planning of activities under the coordination rubric. There are more risks associated with coordinated, as opposed to cooperative, activities because organizations commit resources and the result of their efforts might be beneficial for only one of the parties. Most coordination efforts do not alter individual organization authority, but it involves a form of central power that can add complexity to the decision making process (Mattesich, Murray-Close, & Monsey, 2001).

Collaboration takes place when organizations share authority and responsibility for planning and implementing an action to solve a problem. Stakeholders "engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain" (Wood & Gray, 1991). Basically, according to Hveinden, collaboration is working together on a specific task while cooperation is working on independent tasks towards a common goal (Hveinden, 1994).

Figure 1 depicts the concepts of cooperation, coordination, and collaboration. The NGOs are represented as a set of two entities: a headquarter office and an office at the country or regional level (since NGOs typically have many country or regional offices, a complete representation would look more complex). Headquarters manage regional offices and, because emergencies usually are confined in a geographical region, local centers carry out the relief activities as required. Each **X** in the figure represents a specific

task embedded in a particular domain (represented by the clouds). The dashed lines dividing the three concepts symbolize the soft boundaries of this categorization.

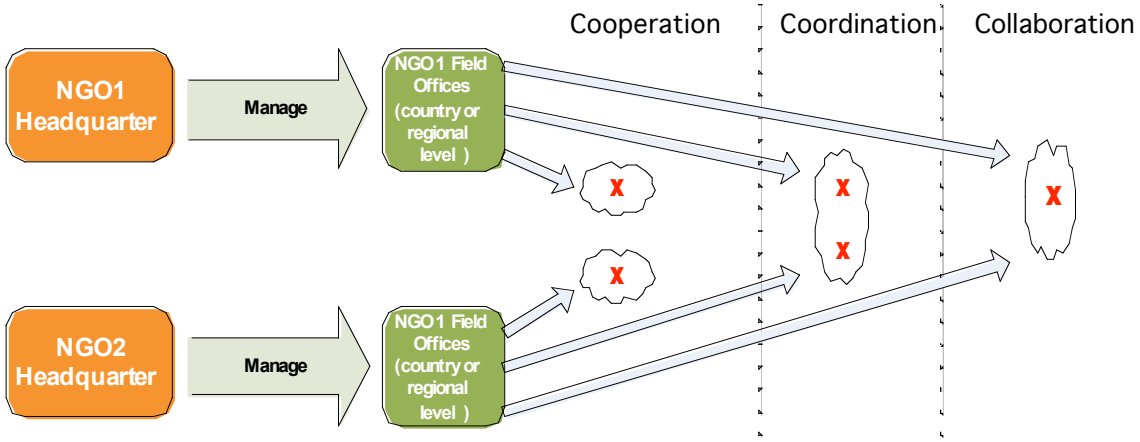

Figure 1. Graphical representation of Cooperation, Coordination and Collaboration between NGOs

Thus, coordination represents a moderate position on the continuum of organizational commitment to joint action. In the domain of ICTs a number of issues must be considered when coordinating tasks that involve both humans and computers (Malone & Crowston, 2001). In particular, coordination processes that can be supported by cooperative work tools include: (1) Managing shared resources, (2) Managing producer/consumer relationships, (3) Managing simultaneity constraints, (4) Managing task/subtasks relationship, (5) Group decision-making, and (6) Communication. Theoretically, these activities have been taken up by the coordination bodies to facilitate inter-agency ICT coordination.

However, drawing on the discussion above in which the headquarters/field role conflict is discussed, inter-agency ICT coordination must also contend with this intra-agency coordination issue. Further, given the distributed organizational structures of humanitarian relief NGOs, the exact meaning of 'inter-agency coordination' must be considered. In particular, while many references to inter-agency coordination presume a headquarters-to-headquarters arrangement, relationships among field employees from agencies are also important to consider. This is particularly the case if joint ICT deployments are to serve beneficiaries rather than the organizations themselves. The variety of coordination mechanisms are depicted in Figure 2 which represents multiple NGOs working together. The thicker lines between headquarters with their respective field offices represent the presumably stronger alignment of intra-agency rather than inter-agency goals.

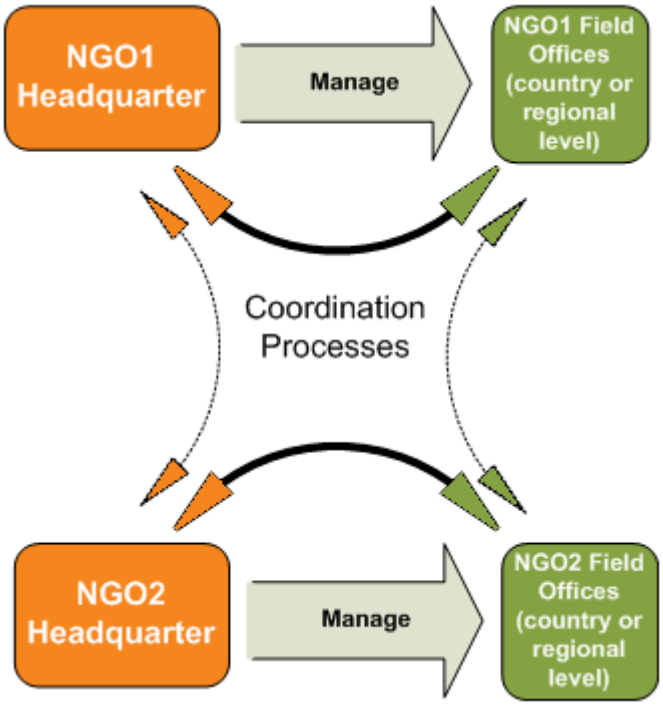

Figure 2. Coordination Processes between NGOs

Thus, coordination is a process whereby organizations seek to achieve mutual goals through commitments of resources, which increases risk. This level of commitment puts it between cooperation and collaboration on a continuum of commitment. Multilateral coordination of ICTs and information management and its required commitment is difficult to achieve and therefore coordination bodies have formed to help overcome some of the challenges outlined above. The extent to which these bodies achieve coordination over collaboration or cooperation is a point of debate but here given the moderate position of coordination they are labeled as such. In the next section we provide data on three such coordination bodies that are committed to enhancing coordination in the ICT and information management domains. The goal, taken up in a subsequent section, is to understand the ways in which organizational differences influence outcomes as well as to identify the challenges they share. The three coordination bodies include ECB4, NetHope and UNOCHA.

METHODOLOGY

Data for the three cases were collected over a period of 15 months (October 2006 through December 2007) through interviews, documentation, and surveys. The specific data collection activities for each case are outlined in Table 1.

Case Study	Interviews	Other
ECB4	12 in-person and telephone	Background documentation; access to conference calls; observations at a meeting
NetHope	19 telephone	Background documentation; access to project conference calls; limited field office survey and observations at meetings
UN Office for Coordination of Humanitarian Affairs	10 telephone	Background documentation; access to conference planning conference calls; observations

		at workshops and symposium and symposium survey

Table 1. Case Study Data Collection Activities

Data collection for the first case study, the Emergency Capacity Building Initiative 4 (ECB4) project, occurred through 12 in-person and telephone interviews as well as access to conference calls. The ECB Initiative also provided documentation to establish context and background to ECB project outcomes.

The second case study focused on NetHope, many members of which were also involved in the ECB Initiative. We conducted 19 telephone interviews with NetHope representatives at both headquarters and field levels. We constructed and analyzed an online survey for representatives at the field office level, receiving a total of 24 responses from a pool of 46 respondents (a 52% response rate). NetHope provided access to project-related conference calls as well as a sub-group meeting and its annual members' meeting. It also provided documentation regarding its organization, as well as its projects, initiatives, and member contact information.

The third case study focused on the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). We conducted 10 interviews with a variety of personnel at UNOCHA and attendees of the 2002 Global Symposium. We attended and observed both the pre-conference workshops and the follow up Global Symposium +5 conference. There we administered a paper-based survey to 175 symposium participants, receiving a total of 68 responses (a 39% response rate).

The data collected through documentation generally was used to focus the construction of interview and survey questions. The information provided in each of the following case descriptions was derived primarily from interviews and participation in conference calls or meetings. Our interview guide was designed to look for activities related to the coordination process in the pre-disaster phase of CB operations. Our analysis of the influence of organizational structure was constructed using all three forms of data—documentation, interviews and participation.

Case 1: ECB4

The Emergency Capacity Building (ECB) project was a collaborative effort of seven agencies of the Inter-agency Working Group on Emergency Capacity. The project, which was funded by The Bill and Melinda Gates Foundation and Microsoft, aimed at improving preparedness for relief efforts of NGOs over a two year period. In particular, it focused on four specific areas: Staff Capacity Development (Initiative 1); Accountability and Impact Measurement (Initiative 2); Disaster Risk Reduction (Initiative 3); and Information and Technology Requirements (Initiative 4). ECB had a decentralized project management structure that coordinated the implementation of its activities for its planned two-year program. ECB4, the last initiative of ECB focusing specifically of ICTs, is the one discussed in this paper. It can be argued that ECB4 does not coordinate activities between the organizations during time of crisis; however it is a coordination effort whose results impacted the responses of the agencies during those crises.

The main task of the ECB4 Initiative, http://www.ecbproject.org/, was to conduct a "major assessment of how information is managed in emergency response and what tools and resources are available for these activities." This task generated four reports, called Information Technology Requirements Assessments (or ITRA): Global Response (Currion, 2006c); Pakistan Earthquake Response (Currion, 2006d); Darfur Response (Currion, 2006a); and, Finding and Recommendations (Currion, 2006b).

The scope of the evaluation done by ECB4 moved beyond the merely technological to include social and informational contexts. The Initiative participants acknowledged that technological solutions should come with procedures that embrace the institutional and managerial dimensions of information sharing. The report, ITRA: Finding and Recommendations (Currion, 2006b), identified five areas needing attention:

1. *National Capacity*: country offices need to train their local personnel and provide local offices with the necessary infrastructure.

2. *Institutional Support*: there are gaps between ICT personnel from head quarters, country level offices, and personnel at the field level.
3. *Strategic Management* is needed to assure continuation of successful past strategies.
4. *Information Requirements*: there is no coherent and standard procedure to collect and share data between agencies.
5. *External Partnerships:* agencies should be open to the possibility of creating partnerships with other NGOs.

Subsequent to the assessment, ECB4 sought to identify a limited set of projects that could help the agencies jointly achieve these goals. The most successful of these projects was ECB4's ICT Skills Building program. This program is conducted at the country level and is a joint effort between ECB and NetHope. According to the final assessment of the ECB project (Morris & Shaughnessy, 2007), more than 10 NGOs were participating in the ICT Skills Building program. The program is offered on-site and on-line, and it has been deployed in India, Guatemala, and Kenya.

Case 2: NetHope

NetHope International (NHI) formed in 2001 as a consortium of a few large humanitarian relief organizations. With initial help from Cisco the organization sought to pool NGOs' demand for IT donations but quickly took on a range of other activities including coordinating ICTs both during disaster response and development activities. NetHope has a high degree of IT-centricity, as its entire focus is to enhance the utilization of ICTs to the benefit of the communities that the NGO members serve. The membership of NHI is by invitation only, and there are currently 22 member organizations (with varying numbers of representatives). The organization's administration and projects are funded through a combination of grants and membership dues. NHI is wholly autonomous, having established itself as a non-profit organization.

NetHope has a board as well as a project committee that approves project ideas from the membership. Also, at the end of the ECB4 project, the efforts of that coordination body were integrated into NetHope as the Emergency Response sub-group. NHI's activities initially focused on the headquarters level of its member organizations, which allowed for collective bargaining with vendors to provide ICT services such as satellite telecommunications, coordination of ICT policies and practices, and more. Their experience has reinforced for them the notion that effective collaboration in emergency response situations rests heavily on the establishment of trust among the members. NHI soon realized that coordination and collaboration at the field level was also necessary to enhance the delivery of services to their client communities and has established a NetHope Chapter initiative with four pilot chapters in India, Sri Lanka, Indonesia, and Latin America.

Within NetHope project involvement is voluntary and funded by member organizations interested in contributing to them. While some member organizations are larger and have more resources to draw upon and contribute to particular projects, these larger organizations do not appear to have disproportionate control over the decision-making process, even though they have financial leverage. The consensus surrounding projects (e.g., satellite communications, connectivity, disaster preparedness, and ICT skills building) has been fairly easily achieved because participation is voluntary and thus those uninterested are unlikely to stand in the way of others for whom the projects are a priority.

Its member organizations' response to the tsunami was a critical point for their collective disaster response efforts. As a result the group developed a 'disaster response survey' form to be used as part of the first stage of a disaster response. Information gathered from the survey can also be used to support the subsequent stages of the response. NetHope has worked toward standardizing the disaster assessment process. Emergency response workers and teams are encouraged to collect the following types of information:

Information Type	Description
Situation Overview	Location, nature and scale of emergency; critical ICT-related issues
Physical Environment	How terrain, climate and access impact ICT (e.g., mountains affecting radio)
Communications Infrastructure	Radio, telephone, internet types and availability, including electricity and local market infrastructures
Regulatory Framework	Customs regulations, licensing procedures, frequency allocations, names and contacts of government officials and offices, procedural requirements, country-specific issues
IT Objectives and Activities	Current and proposed agency presence, response, and requirements; objectives for IT staff, required steps to achieve objectives, guidelines for implementing steps; outline of initial planning, local personnel resources, partnerships, constraints, etc.
Support Requirements	Hardware and software requirements, staff requirements and skill sets, other policy and procedural requirements, budget outline, partner contacts, asset management plans, contingency plans

Table 2. Information Requirements for NetHope Relief IT Questionnaire

Case 3: UNOCHA

The United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) initiated a Global Symposium—a coordination body for humanitarian information management—in recognition of the centrality of information management to effective coordination of timely humanitarian actions in time of disaster. UNOCHA Global Symposium comprises about 300 organizations from the international community that are engaged in information management for humanitarian assistance and disaster relief. They include representatives from donor agencies and disaster management agencies, governmental organizations, United Nations agencies, the Red Cross Movement, non-governmental organizations, scientific and research institutes, academia, the media and the private sector. Coordination of activities and decision-making are done through consensus.

The first UNOCHA Global Symposium was held in Geneva in 2002. The purpose of this first event was threefold: to identify and document best practices in humanitarian information activities, to raise awareness about humanitarian information in the international community, and design a plan for collaboration among participant agencies (UNOCHA, 2002). Participants identified and discussed some major issues related to humanitarian information management, including (i) the need for information principles to guide humanitarian information management and exchange (ten principles were identified), (ii) preparedness, (iii) field-level cooperation among agencies, and the involvement of local governments and organizations in planning activities, and (iv) funding. Participants also identified a set of best practices they considered to be essential to future success of humanitarian information management and exchange.

While the issues confronting the humanitarian community are global in scope, there are regional differences in both the types of problems as well as the appropriate solutions. Since the Geneva 2002 Global Symposium, a total of three regional humanitarian information network workshops were held in Bangkok 2003, Panama City 2005, and Nairobi 2006 that focused on the regional dimensions of the humanitarian information management. According to UNOCHA (2007b) the goals of these workshops are (i) to bring together regional information management professionals in order to strengthen the professional community of practice, (ii) to discuss the principles and best practices in information management, especially those which have been developed at the regional level, and (iii) to deepen understanding of the regional issues and priorities that will help build a plan for improving information exchange in the region.

The recommendations from these workshops reinforced the need for attention to the promotion of standards, user requirements, quality of information, appropriate responses, tools and technology, and strong partnerships.

Five years after launching its humanitarian information coordination body, Global Symposium+5 was convened in Geneva in October 2007 to take stock and discuss the way forward. The Symposium reaffirmed the outcomes of the 2002 Symposium as well as those of the three regional humanitarian information network workshops. The Symposium also reaffirmed UNOCHA's leadership role in the area of humanitarian information and recommended that UNOCHA, in partnership with the Inter-Agency Standing Committee (IASC) and the humanitarian information community of practice, develop an action plan by March 2008 with the goal of implementing recommendations of the symposium (see UNOCHA 2007a).

DISCUSSION

The three cases in this paper represent a diverse spectrum of organization types, mission focus, and ICT usage. Our analysis of the data indicates that while all of the organizations are closed in the sense that they incorporate new members by invitation only, they vary in degrees of autonomy, IT centricity, funding, and governance. The degree to which they rely on and employ strategies of collaboration, coordination or cooperation also differs.

	ECB4	**NetHope**	**UNOCHA**
# of members	7 Agencies	22 agencies with varying numbers of representatives	300 agencies and organizations
Open/Closed Membership	Closed	Closed; by invitation only	Closed; by invitation only
Funding Sources	Private foundation	Yearly membership dues	Various governmental agency sources
Mission Focus	Preparedness, Relief	Preparedness, Relief, moving towards Development	Preparedness, Information management
Degree of Autonomy	High	High	Low
Organizational Level Focus	All Levels	Executive, field	Field
IT Centricity	Low to Moderate	High - entirely devoted to ICT utilization and enhancement	Low – focused on information management, not IT
Governance model	Consensus	Consensus with opt-in/opt-out of specific projects	Consensus

Table 3. Summary of Demographic Comparisons for ECB4, NetHope & UNOCHA

ECB4 was a strongly collaborative effort of a small group of seven humanitarian organizations that was privately funded. The overall mission—emergency capacity building—was jointly defined by the EWG and the funding organization, but the decisions made toward and the goals set for achieving that mission were determined by the member representatives. While there was a high level of collaboration on the initial assessment subsequent actions were less collaborative. The individual member agencies were not obligated to adopt any recommendations, policies or practices established by the ECB Initiative. ECB4's approach to the challenge of capacity building intentionally focused on a wide range of issues in addition to ICTs, such as staff capacity, impact measurement, and risk reduction strategies. Its comprehensive approach led to a variety of recommendations in these areas, leading to a few projects that might have generated coordination if not collaboration. However, the external funding constraints of ECB4 created a time constraint for the organization that has now been merged into NetHope but is itself defunct.

NetHope on the other hand is an ongoing concern that in 2007 hired its first CEO. NetHope combines both development and disaster issues into its IT-centric mandate. In the realm of disaster response it has coordinated the technological dimensions of humanitarian relief among NGOs by outlining a strategic timeline for deployment of humanitarian personnel and the technology needed to support relief efforts. NHI also developed assessment requirements for deploying ICTs in disaster-stricken areas that included information about the damage, geography, human needs, existing infrastructure, regulatory frameworks, IT objectives and activities, as well as ongoing support requirements. This comprehensive approach, which was complemented by a financial investment in the form of yearly dues, allowed NHI's member agencies to consider the outcomes of the NetHope collaboration as the product of their strategic investment upon which they could capitalize and better serve their client communities. While NetHope was able to provide guidelines and tools for deploying ICTs via the collaboration of executives and managers, limiting the efforts among NGOs to the headquarters level also limited their effectiveness in the field. NHI, building upon their own experience at headquarters level, devised a rationale and pilot project for NetHope Chapters at the field level. The rationale is based on the same premise of trust building through information sharing and collaborative activities as a means of fostering the creation and expansion of social networks.

Diverging from both ECB4 and NetHope, UNOCHA is a much larger coordination body focused on information management rather than on IT. The UNOCHA Global Symposium is more concerned with humanitarian information principles and best practices and as such attempts to guide organizational goals and tasks toward a higher degree of cooperation. A core and common theme in humanitarian information exchange is the need for principles and standards. As humanitarian information gains recognition and purpose, it should be guided by a set of humanitarian and operational principles that promote humanitarian objectives and foster trust and accountability among organizations. Participants to the first Global Symposium identified ten operational principles to guide humanitarian information management and exchange, including accessibility, inclusiveness, interoperability, accountability, verifiability, relevance, objectivity, humanity, timeliness and sustainability (UNOCHA, 2002). They also shared experiences in working with systems and tools to improve humanitarian information exchange activities in response to natural disasters and agreed on a set of best practices.

HUMANITARIAN ICT AND INFORMATION MANAGEMENT COORDINATION ISSUES

Coordination among disaster relief organizations is an immensely difficult and complex task. One of the main challenges to humanitarian information management remains the creation of a spirit of sharing that promotes free flow of information and builds trust and commitment among stakeholders. Though the development in technology of recent years has brought about significant progress in humanitarian information management and exchange, organizations are still challenged by disaster relief preparation and response. This major challenge is at the core of most of the issues discussed in the three case studies. We summarize below three significant, overlapping issues for ICT coordination we derived from analysis of our data.

Issue 1: Standardization

Standardization, encompassing information standards, systems interoperability and worker skill sets, is an important issue for all three organizations. UNOCHA focused on the alignment of organizational practices and systems interoperability in generating standards, indicators, guidelines and principles for humanitarian information exchange. NetHope developed standard information requirements in the form of a questionnaire to be used during initial assessment and to support ongoing relief efforts and established an ICT skills building programs to train field workers on the setup and use of equipment and technology used by its member organizations to communicate and share information. ECB4 focused on developing standards related to IT requirements and ICT skills building curricula.

Issue 2: Capacity Building

Capacity building entails both technological and human capacities. Technologically, capacity building focuses on connectivity and takes the form of increased and widespread deployment of ICTs. NetHope, for example, was able to negotiate for its members preferred pricing for the acquisition and use of satellite communications technologies such as BGAN and VSAT. Human capacity building focuses on the ICT

skills building, providing field workers the appropriate skills for setting up and managing the technological infrastructure necessary for emergency and ongoing relief efforts by humanitarian organizations.

Issue 3: Information Availability and Analysis

Timely and accurate information is critical to disaster relief and solutions to availability go beyond issues of standardization. Effectively collecting, compiling, analyzing, and disseminating timely and relevant information is one of the primary challenges for humanitarian information management and exchange activities. The faster organizations can exchange good quality critical humanitarian information, the more effective the disaster response becomes. Yet, identifying and compiling information for humanitarian assistance is not easy and can be very time consuming. Usually, humanitarian information comes from a multitude of different sources and is often constantly changing. It is often incomplete or contradictory. In some cases, there is an overload of information, and in other cases, there are complete gaps in what is known. The issue of availability of accurate and timely information for disaster response was raised in all the three case studies and especially emphasized in ECB4 and UNOCHA.

IMPLICATIONS AND FUTURE RESEARCH

Comparing the efforts of and challenges faced by the coordination bodies described here demonstrates that organizational arrangements will have implications for the level of commitment and scope of projects that can be undertaken by its membership, but also that a set of common issues for the sector exists. Critical to establishing what can be achieved and those achievements' implications is the number of members within the coordination body and the strength of connection between the body and its member agencies. These structural constraints are also likely to inform strategies for handling the common issues of standardization, staff capacity and information availability and analysis.

The efforts of these coordination bodies require further study. Coordination body activities are significant in that they have the potential to influence the strategic, tactical and operational goals of a wide range of organizations involved in disaster relief. Future research will include examination of:

1. Efficiency of coordinating bodies: Investigate the impact of centralized/decentralized actions and decisions on the efficiency and efficacy of ICT deployment in both pre-disaster and response phases of relief operations.
2. Benefits to member organizations: Investigate the benefits of coordination on the individual member organizations.
3. Influence of coordination bodies' information-sharing network structure: Perform a social network analysis of information sharing network in each on the coordination body to explore network structure characteristics that might influence collaboration in humanitarian information sharing network.

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