

Research Article

Crossing Borders, Organizations, Levels, and Technologies: IS Collaboration in Humanitarian Action

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Abstract

In this article, we present a preliminary analysis of four case studies of collaborative information systems (IS) projects initiated by two collaboration bodies within the humanitarian action sector. Collaboration bodies are groups of organizations brought together with the purpose of improving collaboration of their activities. Our goal is to theoretically explore collaborative IS projects as a “gateway” to collaboration among large, international humanitarian organizations. Our findings suggest that: 1) hierarchical relations help overcome technical barriers to collaboration; 2) collaborative IS projects that funnel resources from higher to lower levels of the hierarchy will likely have to deal with the implications of multilevel governance; and 3) collaboration efforts at higher levels of the organizational hierarchy may facilitate collaboration at lower levels, improving collaboration with partners at multiple organizational levels.

Introduction

Humanitarian organizations face increasingly complex challenges due to frequent natural disasters and sociopolitical crises, as well as the growing number of actors in the humanitarian sector (Maitland, Tapia, Ngamassi, & Maldonado, 2008; Ngamassi et al., 2011; Stephenson, 2005, 2006). One of these challenges is the management of information (Bharosa et al., 2010). In an attempt to mitigate this challenge, humanitarian organizations are collaborating through such inter-organizational structures as bodies meant to enhance collaboration on information technologies (IT).

Whereas general humanitarian collaboration bodies might target duplication of action efforts, poor planning and implementation of these efforts, and a lack of awareness among humanitarian organizations on the developing crisis situation, IT-specific bodies aim to reduce redundancies and pool limited IT resources, at the same time promoting inter-organizational information sharing to improve humanitarian action. They also help to ensure that member organizations have access to the best information and communication technologies (ICTs) and practices when assisting during or after humanitarian crises.

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Findings from previous research suggest that inter-organizational IS has a significant impact on inter-organizational collaboration (Clemons & Knez, 1988; Clemons & Row, 1992; Guglar & Dunning, 1993; Gurbaxani & Whang, 1991; Kumar & van Dissel, 1996; Poole & DeSanctis, 1990). According to Kumar and van Dissel (1996), IT plays two important roles in inter-organizational collaboration. First, IT enables collaboration by providing the necessary tools. Second, IT provides support to sustain collaborative inter-organizational relationships, for example, by reducing transaction costs.

The goal of this article is to theoretically explore collaborative IS projects as possible “gateways” to collaboration among large, international humanitarian organizations. In the article, we present a preliminary analysis of four IS project case studies initiated by two collaboration bodies within the humanitarian sector. We assert that these collaboration bodies facilitate four kinds of “cross” collaboration:

1) cross-organization, 2) cross-border, 3) cross-level/cross-hierarchy, and 4) cross-technology. In this study, *cross-organization collaboration* involves more than one member organization in the collaboration body, while *cross-border collaboration* has its locus of impact in several nations or regions, or it involves personnel from several nations or regions. *Cross-hierarchy* or *cross-level collaboration* involves both headquarters-level and field-level representatives from the collaboration body or a member humanitarian organization. *Cross-technology collaboration* involves multiple technological devices, platforms, standards, and policies within the collaboration body, within the project, or among member humanitarian organizations.

This study contributes to the IS literature in two ways. First, IS collaboration is often the first form of collaboration entered into by humanitarian organizations (Maitland & Tapia, 2007; Maldonado, Maitland, & Tapia, 2009). Organizational collaboration among humanitarian organizations is often perceived as difficult (Bennett, 1995; Ngamassi et al., 2011; Stephenson, 2005, 2006; Van Brabant, 1999), especially when the collaboration requires that humanitarian organizations must change some of their basic operations or procedures, or must come to significantly depend on other humanitarian organizations for key elements of their operations (Maitland et al., 2008). However, our research suggests that IS collaboration is perceived as easier to

accomplish, less risky, and poised for success. In addition, donors support these collaborative IS efforts, as they often have the goals of increased accountability, visibility, and efficiency. Whether many of these IS joint system-development efforts actually result in successful collaboration is beside the point. The humanitarian organizations and their donors strongly believe that the first step in collaboration is through IS.

Second, in traditional IS research, collaborations are often contractual networks of dependent firms who are interlocked into supply chains. These contractual relations are often of mutual benefit, but they can also be coercive (Maitland et al., 2008; Maldonado et al., 2009). From our research, we find the IS collaborative actions have been entered into voluntarily and operate under the assumption that consensus acts as the decision-making parameter. While there may be some outside donor agencies that urge IS collaborations, the pressure to collaborate is rarely exerted between partners. The study of this flat-yet-pluralistic space for collaborative systems development is a valuable contribution to IS literature.

In the remainder of this article, we first present a brief introduction to the context of information-centric collaboration in the humanitarian sector. We then discuss our theoretical bases, drawing primarily from two bodies of literature, including 1) IS governance and 2) the role of IS projects in humanitarian inter-organizational collaboration. After presenting our methodology and research design, we examine four case studies set in two collaborative bodies focused on IS in the humanitarian sector, highlighting two projects for each of the two collaborative bodies under consideration. We conclude with a cross-case analysis and discussion of implications for both the humanitarian sector and the body of IS literature.

Context of Information Collaboration Among Humanitarian Organizations

Research on barriers to inter-organizational collaboration has been undertaken both in general organizational contexts (e.g., Burbridge & Nightingale, 1989; Comfort, 1990; Comfort & Kapucu, 2006; Crowston, 1997; De Bruijn, 2006; Faraj & Xiao, 2006; Quarantelli, 1982; Thompson, 1967), and also

among organizations in the nonprofit context (e.g., Bennett, 1995; Bui, Cho, Sankaran, & Sovereign, 2000; Foster-Fishman, Salem, & Allen, 2001; Saab et al., 2008; Uvin, 1999; Van Brabant, 1999). After an analysis of the literature, Ngamassi et al. (2011) found a consistent set of eight kinds of collaboration barriers. They include those arising from 1) bureaucratic interference and turf protection, 2) divergent goals and conflicting interests, 3) resource dependency, 4) collaboration cost, 5) information and communication issues, 6) assessing and planning joint activities, 7) competition for resources, and 8) response time.

In the specific case of inter-organizational collaboration among humanitarian organizations involved in providing humanitarian response, challenges to collaboration also arise from the humanitarian organizations themselves, stemming from their sheer numbers, lack of resources, and desire for autonomy (Uvin, 1999). Researchers have also identified numerous IS-related problems, including the quality and timeliness of information (e.g., De Bruijn, 2006; Fisher & Kingma, 2001), unpredictability of required information (Longstaff, 2005), and unwillingness to share (Ngamassi et al., 2011), as well as mismatch in location, information overload, and misinterpretation of information (Bui et al., 2000; Saab et al., 2008). Moreover, the information issues in inter-organizational collaboration are closely related to uncertainty, with higher levels of uncertainty requiring greater amounts of information to be processed by the decision makers (Galbraith, 1977). To overcome these barriers, formal humanitarian organization "collaboration bodies" have emerged, with a number focused exclusively on information technology and management (that is to say, IS) issues.

Collaboration bodies are meant to resolve the problems of information redundancy, duplication of effort, poor planning and implementation, and basic lack of knowledge and information regarding the humanitarian situations (Maitland et al., 2008; Ngamassi et al., 2011; Saab et al., 2008). In a nutshell, humanitarian organizational collaboration is intended to ensure that priorities are clearly defined, resources are used efficiently, and duplication of effort is minimized, all to serve the ultimate goal of providing coherent, effective, and timely assistance to those in need (Harpviken, Millard, Kjellman, & Strand, 2001). This collaboration can occur at multiple levels and may be carried out through one of

several forms of impetus, including command, consensus, or default. Whatever the form, it must contend with a wide range of challenges.

Theoretical Bases

With the increase in inter-organizational collaboration in the nonprofit context, and especially in the humanitarian field, researchers have been increasingly interested in the driving factors, the implications, the impacts, and the challenges of collaboration. They have employed a wide range of approaches and theories to explain what drives independent organizations to work together (Sowa, 2009). These theoretical lenses include inter-organizational relations theory, exchange theory, population ecology theory, rational choice theory, resource dependence theory, institutional theory, and social network approaches. Each of these major theoretical perspectives has produced distinct explanations of inter-organizational collaboration, which we summarize below.

Inter-organizational relations theory is one of the approaches that researchers have used most frequently to explain why several organizations work together. This theory highlights the importance of such organizational characteristics as small size, diversity, and trust, which are key factors for successful inter-organizational collaborations (Alexander, 1995; Alter & Hage, 1993; Kogut & Singh, 1988). Another approach that researchers have frequently used to study inter-organizational collaboration is the exchange perspective (Levine & White, 1961; Provan & Milward, 1995). The exchange theory posits that organizations get involved in relationships when there is a perception of mutual benefit in interacting. Studies that used this approach found that four factors are integral to successful inter-organizational collaboration: less formalized collaboration (Hall, Clark, Giordano, Johnson, & Van Roekel, 1977), voluntary exchange of resources among organizations (Mulford & Rogers, 1982; Pfeffer & Salancik, 1978), mutual communication (Van de Ven & Walker, 1984), and access to external funding sources (Provan, Beyer, & Kruytenbosch, 1980).

Research on inter-organizational IS collaboration among humanitarian organizations suggests two domains of theoretical knowledge which can provide significant insights. First, the multi-organizational, multilevel nature of the industry has its own

form of multilevel governance, which impacts the nature of collaboration that takes place. Second, projects play an important role in establishing and maintaining IS collaboration in the humanitarian organizations sector as a whole.

Multilevel, Multi-Organizational IS Governance

IS governance is defined as the authority structure that determines the ways in which IS decision rights are divided—ranging from highly centralized to highly decentralized—among corporate, divisional, and business units/line managers in an organization (Brown & Magill, 1998; Weill & Broadbent, 1998). Thus, while mainstream IS governance research considers the division of decision rights and accountability across multiple levels of an organization, it does not fully capture the complex environment of IS collaboration activities across organizations, across borders, across levels, and across technologies.

The complex nature of international, inter-organizational IS collaboration can be viewed through the lens of multilevel, multi-organizational governance theory (Bache & Flinders, 2004; Hooge & Marks, 2001). This theoretical perspective has been applied to the IS domain by Maldonado et al. (2009), who found that it provides an explanatory framework for identifying challenges to, impetuses for, and means of facilitating IS collaboration.

Multilevel, multi-organizational governance facilitates local collaboration on IS projects in two ways. First, collaboration is facilitated by the links among both higher levels of hierarchy, where a broader strategic orientation is often found, and lower levels, where the focus tends to be more operational. Second, this type of governance facilitates collaboration by providing local organizations with access to resources, which are typically controlled through higher levels of authority (*ibid.*).

Role and Function of Projects in IS Collaboration in Humanitarian Action

Research on temporary organizations finds that projects do indeed play a role in establishing collaborative relations among organizations (Bechky, 2006; Goodman & Goodman, 1972; Menger, 1999). These project groupings are often characterized as flexible,

discontinuous, and ephemeral (Meyerson, Weick, & Kramer, 1996). Usually, they are governed by networks of relationships and the social mechanisms of reciprocity, socialization, and reputation, rather than traditional organizational hierarchies and well-established administrative routines (Jones, Hesterly, & Borgatti, 1997; Powell, 1990). Further, Bechky (2006) argues that these temporary organizations, or projects, lead to the development of collaboration mechanisms among traditional organizations. Bechky also argues that, in situations involving things like crisis response teams, temporary project teams play a significant role in overall collaboration through the establishment of role structures (see also Bigley & Roberts, 2001; Weick, 1993). When project teams are created across organizations, levels, and borders, the role and identity of the participant or member may be instrumental in allowing projects to form quickly. Newly formed projects may then lead to further collaboration.

While our research does collectively suggest that IS projects serve as a primary method of collaboration within a humanitarian collaboration body (see Maitland & Tapia, 2007; Maitland et al., 2008; Maitland, Ngamassi, & Tapia, 2009; Maldonado et al., 2009; Saab et al., 2008; Zhao, Yen, Maitland, Tapia, & Ngamassi, 2009), here, we systematically analyze the role of projects, with a particular focus on multidimensional boundary spanning. This investigation of actual IS collaborative projects among humanitarian organizations not only helps to understand the implications of this form of collaboration on humanitarian action; it also provides important insight into how collaboration around IS projects is achieved.

Methodology

This research is a subsection of a larger research effort that examines the nature of collaborative activities across organizations engaged in humanitarian action. The larger research looks at the models of collaboration of IT, management, and data. The research agenda examines horizontal and vertical collaboration among headquarters-level technology initiatives and involves the development of several large-scale case studies of collaborative efforts.

For the purposes of this article, we look at the point where the collaborative action actually takes

place, at the project level. We examine four project cases originating from two collaboration bodies. The four cases under consideration were selected because, at the time, they were the best examples of the forms of IS-focused collaboration bodies within the humanitarian sector. In addition, the chosen cases were the most active and productive, had the strongest membership, and had existed for several years. It is important to note that a body of data gathered from two collaborating bodies concerning four of their projects does not constitute a representative sample and cannot truly be generalized to the entire sector. The data under consideration should be treated as exploratory in nature, with the intent of building theory. Our two collaboration bodies are detailed below.

The Information Technology for Emergency Alliance (ITEA) was a collaboration body consisting of seven agencies funded by a large foundation and a technology firm. Its goal over a two-year period was to improve preparedness for the humanitarian efforts of organizations. In particular, it focused on four specific areas: staff capacity development (Initiative 1), accountability and impact measurement (Initiative 2), crisis risk reduction (Initiative 3), and information and technology requirements (Initiative 4). ITEA had a decentralized project management structure that coordinated the implementation of its activities for its planned two-year program. ITEA4, the last initiative of ITEA and the one focusing specifically on ICTs, is the one discussed in this article. ITEA4's main activity was to conduct an assessment of how information is managed in crisis response, and of what tools and resources are available for these responses.

ReliefTechNet is a collaborative body of humanitarian organizations that was initially founded to pool requests for IT donations, but it quickly took on a range of other activities, including collaborative ICT efforts during crisis response and development activities. Over the 2001–2009 period, ReliefTechNet's membership grew from seven organizations to 25. ReliefTechNet is autonomous, having established itself as a nonprofit organization. The organization's administration and projects are funded through a combination of grants and membership dues. ReliefTechNet has three major stakeholder groups: 1) ReliefTechNet members, 2) ReliefTechNet management, and 3) ReliefTechNet

supporters. Significant interplay exists among these three groups. ReliefTechNet has a board, as well as a project committee that approves project ideas from the membership. ReliefTechNet's activities initially focused on the headquarters level of its member organizations, which allowed for collective bargaining with vendors to provide such ICT services as satellite telecommunications, collaboration of ICT policies and practices, and more. Within ReliefTechNet, project involvement is voluntary and funded by participating organizations. While some member organizations are larger, with more resources to contribute to particular projects, these larger organizations do not appear to have disproportionate control over the decision making, despite their financial leverage. The consensus around projects has been fairly easily achieved, as participation is voluntary; the uninterested organizations are unlikely to impede others for whom the projects are a priority.

With regard to activities, ReliefTechNet develops and implements tools such as the NetReliefKit, which provides data and voice connectivity in a small, transportable suitcase, allowing its members to quickly establish a short-term communications solution during a crisis. ReliefTechNet tests and manages the deployment of communications infrastructure to provide its members with Internet access at remote project sites where humanitarian action and development operations are carried out. ReliefTechNet provides forums for member organizations to document and share their field experiences regarding the telecommunication technology's effectiveness, as well as to suggest ways to improve future service delivery. ReliefTechNet also provides its members with ICT skills capacity building to improve response.

Data Collection and Analysis

This study chooses a case study research for the purposes of capturing holistic detail in natural settings (Creswell, 1998). The case study method is well-suited to studying phenomena that cannot easily be distinguished from their context. This method provides insight into contemporary phenomena in real-life settings, particularly when the boundaries between the phenomenon and its context are blurred (Yin, 2003).

For the purpose of this research, multiple data

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collection methods were employed, per Yin (ibid.). We used three methodologies: in-depth interviews with key informants, textual analysis of documents, and observations of several meetings and events concerning the projects. These three methodologies were necessary because, individually, each data collection method was inadequate to provide a complete picture of the development and collaborative processes.

Yin (1994) suggests that every case study should have a general analytic strategy. In this project, we selected the strategy of explanation building. Explanation building is an iterative process that begins with a theoretical statement (see the prior theory section), refines it, revises the proposition, and repeats this process from the beginning. For each collaboration body and project, a logical chain of evidence was constructed, and an iterative process was conducted. As recommended by Yin (1994), each chain of evidence was established by having sufficient citations to the relevant portions of the case study database, as well as by developing a case study protocol, two steps which clearly indicated the links between the content of the protocol and the initial research questions.

To ensure a high level of credibility and trustworthiness of our data and analysis, we employed several techniques (Gall, Borg, & Gall, 1996). First, we employed three data collection methods (in-depth interviews with key informants, textual analysis of documents, and observations of meetings and events concerning the projects) to establish the validity of findings. Each source was compared against the others to reveal code reinforcement and code conflict. We also used several techniques to ensure the validity of the chain of evidence for our data and analysis. We employed two strategies. One was a strategy of long-term involvement, in that this project was a small part of a larger project in which we spent four years collecting data from the same organizations. We believe this helped to correct for situation-specific influences. The second strategy involved conducting a coding check in which multiple researchers independently coded the data and then cross-checked it for conflicts. We believe that if the raw data and the codes were shared, the logical relationship among research questions, research procedures, raw data, and results should be such that a reasonably prudent person would arrive at the same or similar conclusions as we did.

Data for the two cases were collected over a period of 21 months (October 2006–June 2008).

Semistructured Interviews

Semistructured interviews were the main emphasis, since they allowed the researcher to guide the interviewee to cover specific topics, but were also flexible enough to pursue avenues of inquiry as they arose (Berg, 1989). We conducted 19 interviews with ReliefTechNet staff and representatives of member organizations. We conducted 12 telephone interviews with representatives of ITEA, and we also sat in on several conference calls. Each interview lasted 45–75 minutes. They were recorded, and then transcribed. Interviewing was used to follow up on questions arising from the archival, documentary, and observational data. For ReliefTechNet, we constructed and analyzed an online survey of representatives at the field-office level, receiving 24 responses from a pool of 46 requests (a 52% response rate).

Interview Data Coding

We used a mixture of deductive and inductive approaches (Epstein & Martin, 2004). First, we developed a set of codes based on our research questions. We used these codes deductively, which is useful when the research deals with semi-structured interviews. This technique assumes that the initial interviewee grouping and the questions asked related to a formulated research question or theory. Open and selective coding was carried out for each interview, which allowed themes and categories to be developed. We were able to compare these themes (about assumptions and interpretations) across interviewees, as well as against the research questions and the theoretical framework. During the coding process, we encouraged codes to emerge from the data. The inductive approach reflected frequently reported patterns used in qualitative data analysis. The coding process was iterative and cyclical, based on the framework developed by Seidel (1998).

Direct Observation and Document Analysis

The interview results were complemented by direct observation of the field study and document analyses. We conducted two multiday, in-person observations at ReliefTechNet meetings in 2006 and 2007. We also reviewed and analyzed organizational docu-

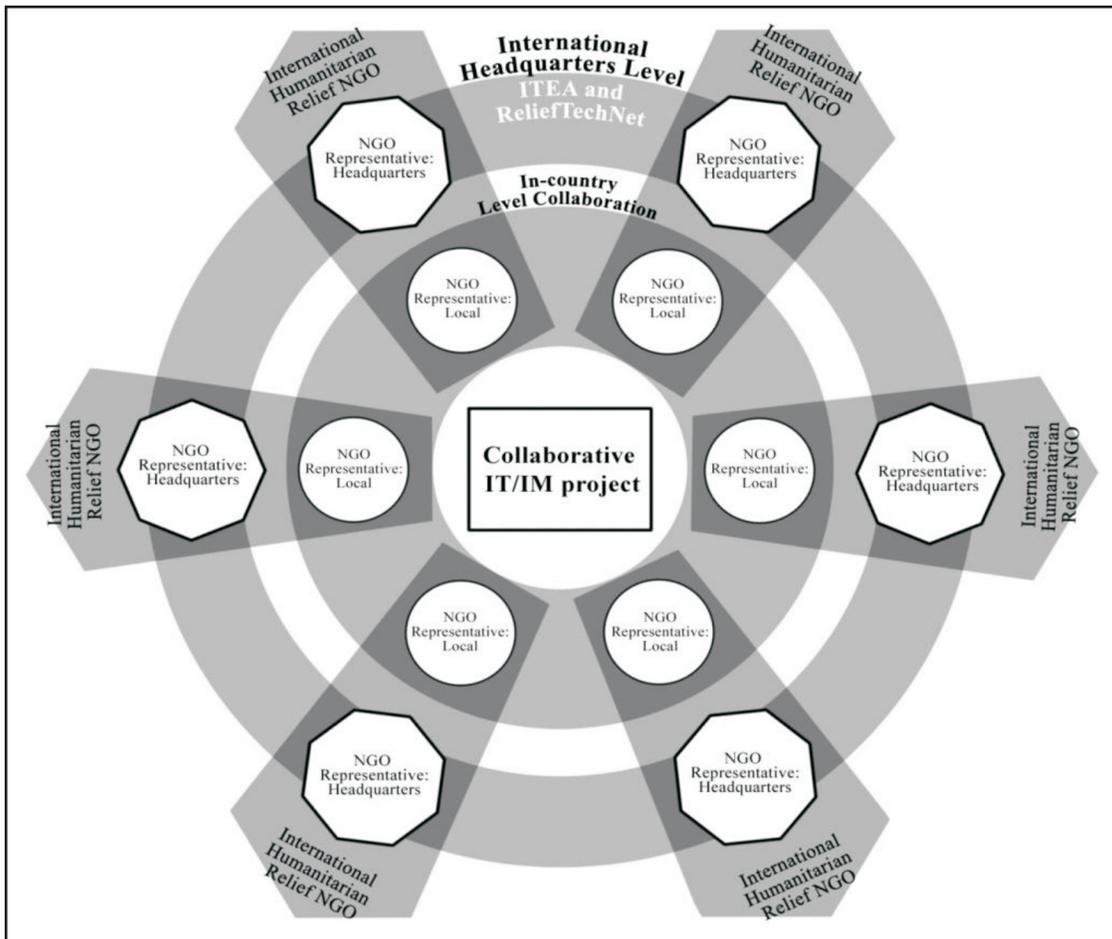


Figure 1. Collaborating Bodies and Their Projects.

ments, including meeting minutes, annual reports, and organization publications. The ITEA4 Initiative provided documentation to establish context and background for ITEA project outcomes.

Project/Case Data

In this section, we discuss four IS projects, two from each collaborative body. Selecting two cases from each body enabled comparisons across the different governance arrangements of the bodies, which may have influenced the nature and degree of the projects' boundary spanning. In the following, we provide a description of each of the four projects.

Within each of the four project discussions, we focus on the four touch-points where collaboration happens across organizations, borders, hierarchies/levels, and technologies. We end each project sec-

tion with a discussion of the success or failure of the overall project and the forms of collaboration it stimulated. Here, we present a limited number of projects as exemplars. This approach is intended to represent the diversity of projects, rather than an exhaustive account, which space limitations preclude.

Figure 1 illustrates the relationship of a project to the collaborative body and its members. The outside ring represents the headquarters-level collaborative body of ITEA and ReliefTechNet. The inner ring represents the regional, local, and field collaborative sub-bodies. In all cases, the headquarters-level collaborative body played a role in the project. In Figure 1, each spoke represents one of the humanitarian organization's project members. The collaborative IS project is placed at the center of this

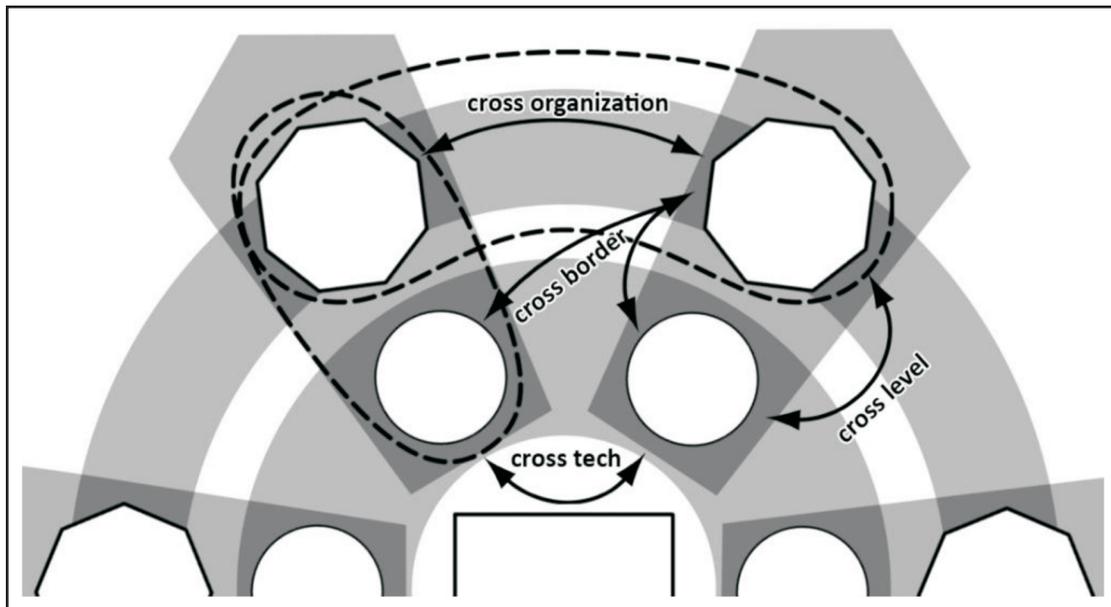


Figure 2. Boundary-spanning and collaboration mechanisms in collaborative body projects.

diagram to represent its central role in facilitating collaboration in each of these collaborative bodies. Figure 1 is a static diagram of the overall collaborative body environment.

In Figure 2, we zoom in on one slice of the original diagram to highlight the dynamic aspects of the collaboration. In Figure 2, we illustrate the four forms of collaboration across organizations, borders, hierarchies/levels, and technologies.

Project 1: National Emergency Response Collaborative (NERC)

Hurricane Stan (2005) gave rise to the National Emergency Response Collaborative (NERC) project. NERC brought together six of the seven ITEA organizations and the National Body for Collaboration on Crisis (in Spanish, CNCD) of a Central American country. The NERC platform was developed as an online tool for emergency-related content management. Access to the NERC platform was restricted to people associated with the project, which acted as a document repository (i.e., geographical presence, emergency procedures, resources, etc.) for each ITEA agency and its field partners.

ITEA attempted to resolve information management issues in its field offices in the same Central American country by using a Web-based portal that would enable the organizations to share informa-

tion. However, the field office personnel lacked the organizational processes and time necessary to post information. Also, the lead agency, which was based in the UK, advocated for the portal to be developed in the open source platform Plone; however, the Internet service providers (ISPs) in the Central American base country were unable to support Plone. While this hurdle was overcome by using a European ISP, it added time and complexity to the project.

Project 2: Field-Level Chapters

During ReliefTechNet's first few years as a collaborative body, its member representatives strongly believed that working only at the headquarters level of their organizations was only semi-effective, and that they needed to replicate their success at the field level. ReliefTechNet chapters were created to address the ICT-centric issues related to effectiveness in inter-organizational collaboration. In 2007, ReliefTechNet-HQ established four smaller, local-regional pilot chapters called ReliefTechNet-Chapters, in India, Sri Lanka, East Africa, and Indonesia.

ReliefTechNet-HQ provided structural guidelines for the ReliefTechNet-Chapters' formation. Each chapter adopted the agenda set forth by ReliefTechNet-HQ and the ReliefTechNet-Chapter advisors for their initial meetings.

Table 1. Project NERC.

NERC	
Across organizations	This project facilitated collaboration across six humanitarian organization members of the ITEA initiative. This project also drew in non-ITEA humanitarian organization members from the host country, as well as the local government.
Across borders	The project resided in a single Central American country. All headquarters-level ITEA members crossed borders to participate in the project.
Across levels	The NERC project was funded and initiated at the headquarters level across seven large humanitarian organizations, and it was implemented by the same humanitarian organizations within and between the county offices (a lower level of within-organization hierarchies).
Across technologies	Plone was established as the underlying technology for the NERC Web portal. Only one of the humanitarian organizations had expertise in this area, and only at the headquarters level.

Table 2. Project Chapters.

Field-Level Chapters	
Across organizations	Chapters were formed in each region/country with field-level members from the original 23-member humanitarian organizations of ReliefTechNet. New members, such as regional/local humanitarian organizations (outside of ReliefTechNet membership), were invited to join the chapter.
Across borders	Each chapter operated in a region/country. They all had diverse memberships drawn across cultures, languages, and borders. All chapters were managed as a single, large project from the headquarters level, giving the project a multinational aspect.
Across levels	While each humanitarian organization operated at many levels, a chapter project operated principally at two levels, the headquarters level and the field level.
Across technologies	While each humanitarian organization managed its own technologies and systems, they all had common needs, such as the need for access to low-cost, reliable connectivity.

Project 3: IT_Emergency_Website

In 2006, the ITEA headquarters-level collaborative body decided to fund a project to address two perceived needs of ICT professionals working in emergency response:

1. a knowledge base, or central repository, for sharing technical information about various emergency-appropriate hardware, software, and telecommunications solutions, and
2. an “emergency response center,” a space dedicated to addressing specific emergencies as they arose, where IS professionals could share technical information about IS activities and service availability in the affected area.

The IT_Emergency_Website project attempted to tackle the broader issue of information sharing. The

collaborative body identified a project to develop a portal through which the agencies could share information. It quickly became obvious that the portal would not be widely used by the members, in part because they lacked the organizational processes for releasing information and the time to post it, particularly during a crisis response time. Other information sources were also being used by organizations that would compete with the portal. The IT_Emergency_Website project did not achieve the kind of adoption necessary for its long-term success, as it may have misunderstood the target user group’s requirements. For example, the “emergency response center” members wanted to be candid about their emergency response work and challenges, but they did not want potentially sensitive information to be made available in such a public

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Table 3. Project Website.

IT_Emergency_Website	
Across organizations	The seven-member humanitarian organization of ITEA participated in the decision to create the IT_Emergency_Website. Once the website was folded into the private intranet, it proved to be a more useful tool across organizations.
Across borders	This project operated at the headquarters level. While the members came from many nations, cross-border collaboration was not a significant aspect of this project.
Across levels	Each ITEA member represented a large international humanitarian organization. Often, the home organization's hierarchy acted as a barrier to sharing information. This was ameliorated when the website became internal-only.
Across technologies	Although this project was Web-based, issues of data-sharing standards were experienced. Each member organization contributed data to the website in different and incompatible forms. Finding and establishing standards became essential to the project's success.

forum. In recognition of member feedback, the decision was made to fold the ER centers into the ITEA intranet, where access was limited only to members.

Subsequently, adoption increased rapidly, and the discussions became richer and more useful. ITEA reported that member support for the enhanced intranet was high, emphasizing that much of this enhancement stemmed from the website content.

Project 4: Very Short Aperture Terminals (VSAT)

Limited availability of telecommunications infrastructure in remote areas, either prior to the crisis or with potentially damaged infrastructure as a result of the crisis, places a significant burden of difficulty on the efforts of field workers to share information with headquarters or other agencies. With no alternatives in place, humanitarian organizations frequently used expensive satellite infrastructure through VSAT (very short aperture terminals). One way humanitarian organizations could lower the costs of VSAT deployment was to bundle resources and cooperate to deploy VSAT technology. A collaborative deployment approach was developed based on a collective agreement with a satellite provider, as the provider could offer attractive prices because of the increased business opportunities with ReliefTechNet members.

Discussion

The purpose of this article is to analyze collaborative IS projects as "gateways" to collaboration among large, international nongovernmental organizations that are members of collaborative bodies. As we

mentioned in the introduction to this article, we assert that these collaborative bodies facilitated four kinds of "cross" collaboration: 1) cross-organization, 2) cross-border, 3) cross-level/cross-hierarchy, and 4) cross-technology. Our definitions of these four kinds of cross collaboration are summarized in Table 5.

The projects we investigated demonstrated variance in the degree and implications for boundary spanning (see Table 6).

Cross-Organization Collaboration

The extent of cross-organizational boundary spanning varied in each project, partly because of the number of organizations involved in the respective collaborative bodies. Another important factor was the degree to which participation was expected as part of membership in the collaborative body. For example, the ITEA projects included most (if not all) members, while the ReliefTechNet projects did not include such high levels of participation. In the ReliefTechNet projects, participation was based on individual organizational needs and interests. Interestingly, the two earlier projects ultimately enabled new local organizations to join the collaborative project. Conversely, the two later projects, while open to members, were closed to new organizations. These differences exist despite the relatively open nature of ReliefTechNet, as compared to ITEA.

Cross-Border Collaboration

All projects involved crossing national boundaries, although they varied in their international breadth. Projects #1 and #3, which involved primarily interna-

Table 4. Project VSAT.

VSAT	
Across organizations	The VSAT project is operational across 10 of the 23 ReliefTechNet member humanitarian organizations. The master contract was negotiated by the project leaders across these 10 organizations and made available to all other ReliefTechNet members.
Across borders	The VSAT project is only partially about collective bundling of technology purchases. It is also about negotiating the rights to establish a VSAT in a region/country.
Across levels	Initially, the VSAT project was primarily operational at the headquarters level. However, once the VSAT sites were established, the field offices became the predominant users, which added a cross-level element to this project.
Across technologies	The VSAT project was primarily a collective technology investment. Each member humanitarian organization participating in the contract agreed to make use of a particular vendor and its technology.

Table 5. Kinds of Cross Collaboration.

Kind of "cross" collaboration	Our definition	Example from case study
Cross-organization collaboration	Collaboration that involves more than one member organization.	NERC (case study #1) facilitated collaboration across six humanitarian organization members of the ITEA initiative. This project also drew in non-ITEA humanitarian organization members from the local country, as well as the local government.
Cross-border collaboration	Collaboration whose locus of impact is in several nations or regions, or involves personnel from several nations or regions.	The IT_Emergency_Website project (case study #3) operated at the headquarters level. The members originated from many nations.
Cross-level/cross-hierarchy collaboration	Collaboration that involves both headquarters- and field-level representatives from within the collaborative bodies or a member humanitarian organization.	In case study #2 (field-level chapters), individual humanitarian organizations operated at many levels. Also, a chapter project operated principally at two levels, the headquarters level and the field level.
Cross-technology collaboration	Collaboration across multiple technological devices, platforms, standards, and policies within the collaborative body, within its project, or among member humanitarian organizations.	In case study #3 (IT_Emergency_Website), each member organization contributed data to the website in different and often incompatible forms. Finding and establishing standards became essential to the project's success.

tional headquarters, were only moderately diverse in their international representation, and in the case of Project #1, just a single country was included in the local dimension. These are juxtaposed with Projects #2 and #4, which had extensive international coverage. For both projects, crossing national boundaries required headquarters staff to deal with many national contexts defined not only by language and culture, but also by differing regulatory environments.

Cross-Level/Cross-Hierarchy Collaboration

Next, we consider the extent to which the projects spanned hierarchies. We find that two of the four projects spanned the full hierarchy between headquarters and local offices. Projects #3 and #4 did have to contend with hierarchy, but they were mainly limited to the hierarchy of the headquarters offices. Also, while we find that the other three did bridge the headquarters/field office divide, the VSAT project did so in a slightly different way than Pro-

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Table 6. Project Comparison.

Cross-case comparison	Project #1 NERC	Project #2 Chapters	Project #3 Website/portal	Project #4 VSAT
Across organizations	Expanded participation	Expanded participation	Closed participation	Closed participation
Across borders	Crossed	Crossed extensive	Crossed	Crossed extensive
Across levels	Full span	Full span	Limited span	Limited span
Across technologies	Problem required immediate resolution	No problem (as yet)	Ongoing problem	Problem required immediate resolution

jects #1, #2 and #3. Projects #1 and #2 made headquarters resources available to local organizations; however, this did not reach the local level.

Cross-Technology Collaboration

Finally, we consider the issue of crossing technologies and formats. Crossing technologies was an issue in Projects #1, #3, and #4. In Projects #1 and #4, the team had to decide quickly on a technology; hence, a standard technology was chosen to move the project forward. However, differing data standards in Project #3, known in IS research to present a greater problem for collaboration due to their relationship with organizational processes (Maitland et al., 2009), posed an ongoing problem. In Project #2, the issue of technology had yet to arise, as it did not, in the first instance, involve technology. However, as local chapters in Project #2 begin new undertakings, these issues may arise.

There appeared to be an interesting relationship between crossing hierarchies and technologies. First, the project with the most significant technology problem was the one that had the most limited span of hierarchy. In the one hierarchy-spanning project with technology issues, these issues were resolved largely due to the decision-making power of the higher levels of hierarchy. Hence, the lack of resolution of the technology issues in Project #3 could be explained by a lack of hierarchy spanning. However, Project #4 also pooled resources, but it was able to overcome technical issues. Furthermore, in Project #4, the technology issues were resolved at headquarters; they were not resolved by the application of decision-making power. However, it may be possible that making Internet connectivity cheaper in remote areas will eventually benefit those at lower levels in the hierarchy, to whom those in the

higher levels of the hierarchy feel responsible. Thus, it appears there is a relationship between the resolution of technical problems and ability to apply power within a hierarchy; that is, whether the solution to the problem requires a vertical (power-based) solution or a horizontal (consensus-based) solution.

These findings suggest that, all else being equal, hierarchical relations help to overcome technical barriers to collaboration. Our previous research suggested that humanitarian organization collaborative bodies could help to alleviate the problem of competition for resources (Ngamassi et al., 2011). Our findings also suggest that collaborative projects that funnel resources from higher to lower levels of the hierarchy will likely have to deal with the implications of multilevel governance. These findings can be contrasted with projects, such as Projects #3 and #4, that are mainly focused on one level of organizational hierarchy. This research suggests that collaborative efforts at higher levels of the organizational hierarchy may facilitate collaboration at lower levels, improving collaboration with partners at multiple organizational levels.

Conclusions

After such major crises as the Southeast Asian tsunami; Hurricane Katrina; and the Pakistani, Haitian, and Chilean earthquakes, the humanitarian action providers identified response problems as being, in part, information problems. The donors and leaders of humanitarian organizations demanded increased levels of accountability in terms of dollars spent, services provided, and goods delivered. This problem was simultaneously defined at both the headquarters and country levels, suggesting a multi-organizational, multilevel information problem.

Consequently, collaborative bodies were created across large humanitarian organizations to focus on the topic of addressing informational problems in the humanitarian and crisis response sectors. We believe that collaborative, multilevel, multi-organizational projects will dominate the initiatives in the humanitarian and crisis information management sectors in the future.

As we have seen from earlier research on inter-organizational IS collaboration among humanitarian organizations, the findings suggest, first, that projects play an important role in establishing and maintaining IS collaboration in the humanitarian organization sector as a whole. Second, the multi-organizational, multilevel nature of the industry has its own form of multilevel governance, which impacts the nature of collaboration.

In our examination of collaborative bodies, collaboration frequently took place through project-related activities. Our findings suggest that collaborative bodies, or at least those encountered in our research, attempt to address collaboration issues through projects undertaken by their members (either the entire collaborative body or, more likely, a subset). In both collaborative bodies studied here, the membership spoke of how important conducting initial common projects was to expanding collaboration. ReliefTechNet engaged in more projects that were IT-related than ITEA. These projects involved problems that were easier to solve, in that IT-based barriers to collaboration can, to some degree, be associated with technological layers (e.g., the OSI model or TCP/IP stack), giving managers across organizations a common frame of reference. Further, information technology managers typically occupy a particular position on an organizational chart and, hence, it was easier to identify potential partners for collaboration. ITEA engaged in more strategic, organizational, information-management projects. In these cases, there was no common frame of reference, and the problems were more diffuse. There also usually wasn't an established organizational unit to which one could propose solutions. Information management issues typically required higher levels of organizational change. This was a larger adjustment than was typically required by the adoption of a new platform or piece of software.

Our contribution from this research is that there is strong value in the collaborative project within

coordinating bodies in the humanitarian sector. We believe the coordinating body created a structure and mechanism for member organizations and outside donors to channel funding, staff, and supplies to create collaborative IT projects that might have been impossible for any single humanitarian organization. Collaborative projects help to develop trust and bilateral relations among members, while at the same time, to build systems and processes that foster further collaboration (Saab, Tapia, Maitland, Maldonado, & Ngamassi, 2013). The implications are that a well-structured coordinating body with the appropriate subprojects might facilitate collaboration around IT issues across organizations.

On the other hand, when we think about the wider theory of multilevel governance, we find that there exists evidence that centralization, at least to some degree, provides an important incentive, namely resources. The resource transfer from higher to lower levels is a key factor in multilevel governance for IS, as these resources help local organizations overcome resource constraints to collaboration. Our research is a significant departure from previous IS research, in that it is concerned with a multilevel, multi-organizational context. While such forms are common in the humanitarian context, they differ from the single-organization systems typically found in the private sector. Further, this context represents a highly decentralized arrangement in comparison to IS governance in organizations with business units involved in joint ventures (Sambamurthy & Zmud, 1999).

IS development for humanitarian action is increasingly being undertaken in multilevel, multi-organizational contexts. Despite this trend, little is known about the mechanisms of collaborative IS project processes and outcomes. While such initiatives may face resistance in the for-profit sector, as competitive pressures create challenges for collaborative systems, in the nonprofit sector, there is great incentive for collaborative systems. The particularity of the humanitarian sector is that, although humanitarian organizations may compete for donor dollars and to offer more efficient and effective help to beneficiaries, there is a common benefit for all agencies when help is delivered.

Lastly, this research makes two important contributions to the IS literature. First, collaborative IS projects are often the first form of collaboration entered into by humanitarian organizations. Second,

in traditional IS research, collaborations are often contractual networks of dependent firms interlocked into supply chains. From our research, we have found that the collaborative IS projects are entered into voluntarily and operate by consensus as the decision-making parameter. These contributions are venues for future research.

Future research is needed to investigate the effectiveness of these cross-category collaborative mechanisms. The evaluation of the effectiveness of each of these mechanisms is complex. This is so because there is no reliable, quantitative way to measure the degree of collaboration that a specific project was able to generate at a given organizational level or in addressing a given sub-challenge. For example, it would be misleading to use the success of a project as a measurement of the degree of collaboration, since a failed project could have created invaluable collaborative links and procedures. The measure of communication and information exchange among organizations is controversial, since there is no clear way to discern among messages or phone calls which were due to collaborative mechanisms, and which were not.

This research examined unique collaborative fora for inter-organizational IS design among peer humanitarian organizations. However, the humanitarian sector does include contractually oriented relations in its supply chains. Future research might examine the extent to which these cross-relationships and the benefits of hierarchy might apply to collaborative IS design in the humanitarian supply chain context. In particular, such research might investigate the extent to which these benefits apply in the context of these supply chains' short life cycles (Day, Junlas, & Silva, 2009).

In addition, future research is needed to overcome other limitations of this study related to research design. Findings from this research cannot be generalized to all humanitarian organizations' collaborative bodies. Generalizing from four case studies would be epistemologically problematic, and it would also run the risk of being easily falsified by a single counter-example (Benbasat, Goldstein, & Mead, 1987). However, this risk can be partially overcome by conducting several similar case studies. ■

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