

# Information Management and Technology Issues Addressed by Humanitarian Relief Coordination Bodies

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## ABSTRACT

Coordination bodies that attempt to overcome coordination barriers in humanitarian relief face many challenges. Among them are general organizational barriers to coordination as well as functionally-oriented barriers arising specifically from information management (IM) and information technology (IT) issues. Based on data collected from three coordination bodies, the research presented here examines IM and IT-related barriers, identifying similarities and differences between them as well as requirements for resolving them. The research finds that while many similarities exist, resolving IM issues typically requires higher levels of organizational change as compared to IT-related barriers. The research concludes that coordination bodies need to address a mixture of IT and IM related issues both to foster better coordination but also to ensure their efforts are successful.

## Keywords

Inter-organizational coordination, coordination bodies, humanitarian relief, information management, information technology.

## INTRODUCTION

Inter-organizational coordination has become an increasingly significant challenge in humanitarian relief as both the number of disasters and number of organizations responding to them has grown. Such coordination faces numerous challenges and coordination bodies have been formed to help overcome them. However, given the large number of challenges, it is unlikely coordination bodies will be able to address them all. Thus, greater attention particularly to the sources of these challenges is needed to help improve coordination through enhanced organizational designs, technology choices and management strategies.

In this context the challenges to inter-organizational coordination can stem from the individual organizations, the coordination body or both. While there has been extensive research on the barriers associated with individual organizations (e.g. Bennett, 1995; Bui et al., 2000; Uvin, 1999; Van Brabant, 1999), only limited research efforts have focused on the coordination bodies themselves (e.g. Ngamassi, 2008). However, these studies tend to address the general organizational barriers to coordination and overlook the barriers specific to information management and information technology coordination.

The research presented herein bridges this gap by examining inter-organizational coordination issues arising from information management and technology challenges that are addressed by coordination bodies. The study draws on case studies of three coordination bodies, two focused primarily on information management and one on information technology. In particular we seek to address the questions: In what ways are information management and information technology coordination problems related to organizational barriers to coordination? How can these problems be characterized? How are information management and information technology coordination problems similar and different? And how do these similarities and differences influence the likelihood of success of humanitarian relief coordination bodies?

The paper is structured as follows. The first section reviews the literature on inter-organizational coordination and challenges to information management and technology coordination in humanitarian relief. The second section presents the method, which is followed by the section with the case data. The paper closes with a combined discussion and conclusion section in which the cases are compared and analyzed.

## INTER-ORGANIZATIONAL COORDINATION BODIES

To overcome the challenges of coordination, humanitarian NGOs are forming structures such as coalitions, alliances, partnerships, and coordination bodies (Guo, 2005; Zhao, 2008). Studies of these structures have identified their similarities and differences, with similarities including: (i) independence from government; (ii) existence of a semi-permanent secretariat; and (iii) a variety of participants sharing common ideology (Bennett, 1994). Conversely differences are found in their structure, size, formality and duration. Structural variations are observed in their variety of missions, organizational forms, and decision making processes. Size variations are reflected in coordination entities that attempt to coordinate intensely among a small subset of NGOs, or target larger memberships and less complex interactions. Variation in the level of formality and authority depends on who has taken the initiative to set up the coordination entity, and which agencies are involved (Harpviken, 2001). Moreover, coordination entities may be temporary initiatives, ongoing inter-agency bodies or permanent incorporated nonprofit organizations (Zhao, 2008). These variations have in turn generated a variety of labels, with coordination entities referred to as consortia, councils, federations, umbrella agencies, networks, and coordination bodies (Donini, 1995). Here we adopt the latter term, coordination bodies.

Despite their popularity, the existing scholarship has only to a limited extent examined the benefits of coordination bodies. In a study related to the research presented here, Ngamassi et al. (2008) present findings from a comparison of the benefits of two coordination bodies. The study finds that the major inter-organizational coordination problems the bodies must contend with include conflicting interests and coordination costs in terms of resource inputs, especially staff-time. In their analysis Ngamassi et al. (2008) classify the various barriers as structural, mandate or behavioral barriers. Structural barriers arise when appropriate governance and accountability frameworks are lacking, as well as adequate resources. Mandate barriers arise when coordination body member organizations are not committed to effective coordination and do not prioritize the coordinated activities. Finally behavioral barriers result when organizations are represented by people without the appropriate authority, culture, skills and competencies to work collaboratively.

The research found that for the two NGO coordination bodies, mandate and structural barriers were more important than behavioral barriers in undermining coordination. Further, while important, structural barriers were found to be more diffuse than mandate barriers. Also, among eight commonly known general coordination barriers (e.g. resources, goal conflicts, etc.) the only barrier the bodies were able to overcome is competition for resources.

In addition to these more general coordination barriers, Ngamassi et al. (2008) found that coordination body members also face functionally determined coordination barriers, in this case related to IT. However, due to the prominence of more general coordination barriers, such as resource constraints and conflicting interests, their conceptualization of the IT-related barriers received less attention. The research presented here seeks to develop these notions further, taking up where their work left off.

## INFORMATION MANAGEMENT AND INFORMATION TECHNOLOGY COORDINATION

The goal here is to differentiate general coordination barriers, often associated with general characteristics or policies of the organizations, with those of information management (IM) and information technology (IT). In doing so we seek to create categories of barriers, however it is unlikely these categories will be purely mutually exclusive. As will become clear in the following discussion, and particularly as reflected in Table 1, in terms of their relationship to organizational characteristics, the barriers fall on somewhat of a continuum with general coordination barriers being most closely related to the organizations and IT the least, with IM-related barriers falling somewhere in between. In the following we discuss each in turn.

Inter-organizational coordination is concerned with coordinating activities among various organizations, having their own goals, processes, information, applications and technology. General coordination barriers originate from the organizational characteristics and occur at multiple levels. As discuss above these barriers include, among others, divergent goals and conflicting interests, bureaucratic barriers and turf-protection, resources and coordination cost.

While present in the realm of IM and IT-related coordination, these barriers can be generalized to nearly any domain and their resolution rests most significantly on managerial actions. Further, they typically represent the most significant coordination barriers, the ones that in empirical research managers most frequently identify as barriers. As such they do represent important targets for improving coordination and deservedly receive the most attention. However, in establishing an agenda to be undertaken by IM and IT-oriented coordination bodies, it is important to recognize that even if the body can help its members overcome these more general obstacles, they are still likely to face barriers that arise specifically from IM and IT issues.

Information is a key asset for humanitarian inter-organizational coordination. Information management must contend with its production, retrieval, processing, validation, consumption and distributions. Criteria for success include its relevance to decision-makers, timeliness and accuracy. As regards inter-organizational humanitarian coordination, researchers have identified numerous information management related problems, including the quality and timeliness of information (e.g., (De Bruijn, 2006; Fisher, 2001), unpredictability of required information (Longstaff, 2005), unwillingness to share (Ngamassi et al, 2008), and mismatch in location, information overload, and misinterpretation of information (Bui et al., 2000; Saab et al, 2008). Also, the information issues in inter-organizational coordination are closely related to the issue of uncertainty, with higher levels of uncertainty requiring greater amounts of information to be processed by decision makers (Galbraith, 1976).

While not all information management issues are resolved by technology, the increased use of information technologies in humanitarian assistance brings these two sets of coordination barriers, IM and IT, closer together. In particular, IT has been shown to play a critical role in inter-organizational disaster response plans (Comfort, 1990; Comfort, 2006; Moss, 2006), while at the same time it also hinders inter-organizational coordination (e.g., (Bui et al., 2000; Junglas, 2007; Miller, 2005; Saab et al, 2008). Inter-organizational coordination issues related to technology include technical interoperability, semantic interoperability, non-matching data formats, different presentation forms, and heterogeneous systems. Clearly some of these issues, e.g. semantic interoperability, have both information management and technology components. However, one way in which information technology and information management differ is in the network characteristics of some technologies and issues of technological development.

It is likely that inter-organizational coordination will be influenced by issues of network externalities, where the utility of the system for each user is dependent on the number of users that adopt the system overall. This interdependent nature can create incentives for coordination, however these incentives may be overpowered by issues of technological development, including technological trajectories and their associated switching costs. Information technologies tend to develop incrementally, with each new generation guaranteeing backward compatibility, or inter-operability across generations. However, competing technologies are frequently incompatible. To switch from one to the other, for example as part of the process of inter-organizational coordination, becomes a decision that not only requires transitioning current and future files, but potentially old files as well.

These issues may create particular incentives and disincentives to inter-organizational coordination. For example, for suppliers of network services the incremental cost of additional users is low and hence they may offer volume discounts. These discounts may provide incentives to organizations to work together to pool their demand for such services. Conversely, high switching costs may create a threshold effect for coordination. In contexts with high switching costs, having similar platforms could become a pre-requisite in choosing potential partners for inter-organizational coordination as switching is highly likely.

These challenges are specific to information technology and do not necessarily apply to information management-related or general coordination barriers. Hence, these theoretical concepts provide additional justification for separate consideration of IT and potentially even IM-related coordination barriers. The different domains and associated barriers are presented in Table 1.

Domain	General Issues	Specific Barriers	Authors
Organizational	<ul style="list-style-type: none"> <li>Inter-organizational Coordination</li> </ul>	<ul style="list-style-type: none"> <li>Divergent goals,</li> <li>Conflicting interests,</li> <li>Turf protection,</li> <li>Coordination cost</li> <li>Lack of resources,</li> <li>Ineffective utilization of resources,</li> <li>Ineffective joint assessment and planning</li> </ul>	Bennett 1995; Van Brabant, 1999; Bui et al, 2000; Ngamassi et al, 2008; Burbridge and Nightingale, 1989; Uvin, 1999; Aldrich, 1972; Crowston, 1997; Dawes, 2004
Information Management	<ul style="list-style-type: none"> <li>Information availability and accessibility,</li> <li>Information quality,</li> <li>Information Sharing</li> </ul>	<ul style="list-style-type: none"> <li>Lack of sharing spirit,</li> <li>Timeliness,</li> <li>Validation of information,</li> <li>Relevancy of information,</li> <li>Mismatch in time,</li> <li>Mismatch in location,</li> <li>Combining information</li> </ul>	Galbraith, 1976; Fisher & Kingma, 2001; Helbing, 2006; Helsloot, 2005; Ngamassi et al., 2008; Chen & Dahanayake, 2006; Greef & Arciszewski, 2007; DeBruijn, 2006

		sources, • No shared information sources • Information distortion • Information standardization	
Information Technology	• Information system quality, • Standards and interoperability • Systems integration, • Lack of resources	• Technical interoperability, • Semantic interoperability, • Non-matching data format, • Different presentation forms, • Heterogeneous systems	Bui et al., 2000 ; Junglas & Ives, 2007 ; Miller et al, 2005 ;Saab et al., 2008

**Table 1: Categories of Coordination Barriers**

In addition to practical and theoretically-based justification for separate consideration of IM and IT-related coordination barriers, such an inquiry contributes to the particular domain of information systems scholarship in which the technology artifacts are made a central component for theory building. Spurred by a research commentary by Orlikowski and Iacono (2001), this body of work suggests that technological artifacts need to be more fully considered (see e.g., Boudreau and Robey 2005; Kallinikos 2004; Schultze and Orlikowski 2004). In the domain studied here, namely IT and IM-oriented coordination bodies, consideration of the specific role IM and IT play in both generating and overcoming coordination barriers, even at a somewhat general level, in addition to a better understanding of how IM and IT-related barriers can be overcome, will help build more robust theory of coordination bodies generally and potentially generate enhanced recommendations for coordination body design and management.

Hence, we seek to address the following questions: In what ways are information management and information technology coordination problems related to organizational barriers to coordination? How can these problems be characterized? How are information management and information technology coordination problems similar and different? And how do these similarities and differences influence the likelihood of success of humanitarian relief coordination bodies?

## METHOD

To address these questions this research employs a multiple case design within which a variety of data collection mechanisms are carried out. Described in detail below, the three coordination bodies examined here include a small, temporary group designed to undertake projects within a broader funded project mandate (ITEA), a larger, formal, non-profit entity with a moderate number of members (ReliefTechNet), and a community of humanitarian information management professionals organized by the United Nations, the Network for Humanitarian Information Management (NHIM)<sup>1</sup>. The cases vary in the extent to which coordination is a primary goal for the organization. As coordination is often necessary to achieve other goals it can be a secondary goal as in NHIM or a primary goal as in ITEA. Whether primary or secondary, the coordination body must address the challenges to coordination.

As is common in the case study method, multiple data collection methods were employed (Yin, 2003). Data for the three cases were collected over a period of 21 months (October 2006 through June 2008) and data sources included semi-structured interviews, direct observation, document analysis and surveys. The specific data collection activities for each case are outlined in Table 2 below.

The semi-structured interviews were guided by the researchers to cover specific topics, but were flexible enough to pursue avenues of inquiry as they arise during the interview process (Berg, 1989). For each case we conducted interviews including nineteen (19) telephone interviews with ReliefTechNet staff and representatives of member organizations, twelve (12) telephone and face-to-face interviews with ITEA representatives, and ten (10) telephone and face-to-face interviews with NHIM staff and members. More significantly, each of the cases includes extensive observational and participatory data collection techniques. Two researchers attended face-to-face meetings for each case for the following number of days: ITEA 1; ReliefTechNet 3; NHIM 6. These were supplemented by participation in numerous conference calls for each case. Further for the NHIM case a three phase survey-based symposium evaluation is being carried out.

Case Study	Interviews	Other
ITEA	12 (both face to face and telephone)	Background documentation; access to conference calls; observations at meetings
ReliefTechNet	19 (telephone)	Background documentation; access to project conference

<sup>1</sup> ITEA, ReliefTechNet and NHIM are pseudonyms.

		calls; limited field office survey and observations at meetings
NHIM	10 (both face to face and telephone)	Two surveys about the 2007 meeting, observations at workshop and meeting, background, working group and symposium documentation

**Table 2: Case Study Data Collection Activities**

**The Information Technology for Emergency Alliance (ITEA)** is a coordination body consisting of seven agencies funded by a large foundation and a technology firm. Its goal was to improve 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). 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 focusing specifically on information and communication technologies (ICTs), is the one discussed in this paper.

**ReliefTechNet** is a coordination body of humanitarian NGOs founded initially to pool requests for IT donations, but quickly took on a range of other activities including coordinating ICTs, both during disaster response and development activities. Between 2001 and 2008 ReliefTechNet membership grew from 7 to 25. The organization's administration and projects are funded through a combination of grants and membership dues. ReliefTechNet is wholly autonomous, having established itself as a non-profit organization.

**NHIM** spear-headed by the United Nations, began in 2002 as a meeting of humanitarian information management professionals. The 2002 meeting resulted in a popular and well-used set of principles and best practices for the field. A second NHIM meeting, held in October 2007, brought together more than 300 participants from roughly 100 international organizations in the field of humanitarian assistance. They included representatives from donor agencies and disaster management agencies, governmental organizations, United Nations agencies, the Red Cross Movement, nongovernmental organizations, scientific and research institutes, academia, the media and the private sector. The two day meeting was preceded by a three-day workshop in which five different Working Groups prepared statements for the meeting.

## CASE DATA

To understand the nature of the inter-organizational coordination barriers faced by the members of these three bodies and how these bodies attempt to overcome them we provide examples of some of the projects they have or are intending to pursue, or those they merely recommend the members undertake. We have found that coordination bodies, or at least those encountered in our research, attempt to address coordination issues through projects undertaken by their members, either the entire set or more likely a subset. The projects help to develop trust and bilateral relations among members, while building systems and processes that foster coordination. The examples presented here focus on IT and IM projects and are not exhaustive, meant merely to provide empirical evidence with which we can begin to explore the similarities and differences between general organizational coordination barriers, and those specifically related to IM and IT. In the following, the examples are organized by case study.

### ITEA

A long standing coordination issue in humanitarian response has been disaster assessments. Disaster site assessments are carried out by nearly every organization that responds in order to provide the information necessary to plan an appropriate response. While a portion (some would argue most) of the information gathered is common to many if not all organizations, there are agency-specific pieces of information, typically related to their mission - whether that is supporting children or rebuilding hospitals - which create barriers to coordinated assessment.

The ITEA attempted to resolve this issue among its small number of member organizations. In such a complex and mission critical area as assessment, it was expected that the small number of organizations would ensure success. To further enhance their chances of success the group opted to limit the scope of the project to one location, rather than pursuing an agency-wide project. However, despite careful planning and what appeared to be an ideal organizational environment, the project failed to implement the joint assessment.

Not being the first failed attempt at joint assessment, previous failures have been attributed to the strategic nature of the information. In particular, in addition to its operational value, assessment information serves as the basis for donor requests. This generates requirements of accuracy and validity, requiring a trusted source.

However, among the seven in this group it was believed that these issues had been overcome. Instead the barriers arose from ontological problems within the various programs of the agencies. For example, program staff may have used different definitions of ‘a household.’

This small coordination body also attempted to tackle the broader issue of information sharing. The coordination body decided to build an information sharing portal for the member agencies. One organization took the lead and established the portal’s structure and began to populate it with information. However, 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 time to post it, particularly during the stressful and time intensive period of a disaster response. Also, other information sources were being used that would compete with the site. For example, some managers pointed to ReliefWeb as an important source of information during disasters. While the ReliefWeb information could not completely fulfill the information needs for inter-organizational coordination within this small group, its timeliness and accuracy, together with being free, in general raises the threshold for domain- or organization-specific websites.

ITEA also attempted to resolve information management issues in their field offices in a Central American country. It was believed that a web-based portal would enable the organizations to share information. However, similar to their headquarters counterparts, the field office personnel lacked the organizational processes and time necessary to post the information. Also, in the process of developing the portal an information technology issue arose. The lead agency, based in the UK advocated for the portal to be developed in the open source platform Plone. However, there were few IT professionals in the Central American country with Plone experience. While this hurdle was overcome by using a UK professional remotely, it did add time and expense to the project.

### **ReliefTechNet**

One of the earliest projects of ReliefTechNet was to facilitate shared access to VSAT services. The group of IT managers was able to pool demand for Internet connectivity, a particular value of this coordination body. The VSAT project originated in 2003, when a Request For Proposal (RFP) was sent out to VSAT service providers. Throughout 2003 and 2004 negotiations with VSAT vendors took place. Once a vendor was selected, the group established both a master contract as well as individual contracts for each member organization. The consensus required for these contracts and the logistics of having multiple individual contracts signed generated significant delays. Finally, in 2005 a contract was signed between ReliefTechNet, its member agencies, and the preferred vendor. The project has been a success with over 100 dedicated VSAT installations among nine agencies by 2007.

A second popular project of ReliefTechNet has been a network kit that provides data and voice connectivity in a ruggedized suitcase. The kit was developed by a technology vendor with extensive input from the ReliefTechNet members. When it was still in the trial phase, the tsunami struck. Through the teamwork of ReliefTechNet members operating across the globe and coordinating on the ground, the trial units were hand-delivered from the USA to the neediest sites to support relief workers. The kit provided a critical near-term solution until longer-term communications could be rebuilt. The team response was possible because ReliefTechNet coordinated daily conference calls among members to share information about technology needs and strategies for implementing solutions, thereby avoiding wasted or duplicated effort.

### **NHIM**

The NHIM case identifies recommendations rather than details specific projects. The meeting’s final report made the following recommendations. In particular, the report’s authors observe that within the humanitarian community, information management is still largely associated with technology and often falls under the domain of an organization’s IT department or division. They propose improvements in the working relationship between both IT and IM professionals as well as with end-users, including the decision makers and humanitarian practitioners.

Further, the symposium participants also considered the applicability of emerging technologies such as Web 2.0 social networking technology, blogs, wikis, video podcasts and RSS feeds, among others. Further, implications of these were contemplated together with the growing accessibility of technology globally. This accessibility has meant that within minutes of a disaster or outbreak of conflict, the first reports and images of the event increasingly come from personal witnesses and “citizen journalists” using mobile phones and other wireless PDA devices. This technology provides new means to transmit information—including from areas that may not have on-the-ground media or a humanitarian presence. While beneficial, these new technologies will also present challenges in that they may be unreliable, convey misinformation, disinformation, and covert propaganda that could be counter-productive to humanitarian decision-making and operations.

The meeting participants have also observed that technologies should be developed based upon agreed standards for interoperability and to ensure wide usage throughout the community. Sustained investment and well-maintained data are essential in order to keep technology, tools and systems operating and functional. And finally these tools and systems require user training, as well as dedicated professionals to design, develop and integrate them into humanitarian applications.

In terms of dealing with the heterogeneous organizations within the humanitarian relief field, the NHIM members observed that while large organizations may have access to resources, adopting new technologies may be nontrivial. In particular, larger organizations, with larger bureaucracies, may require new hardware, software and systems to undergo onerous computer security and accreditation processes and may be met with resistance by personnel accustomed and committed to the existing technology.

Further, tools for fostering collaboration need to align with the social networks that already exist or emerge during the onset of an emergency. Tools and services should be easy to use, easy to deploy, and reduce technical dependency. Also, the NHIM participants recommend that when possible free and open source software should be used to improve access to information and IM systems by all stakeholders in the humanitarian community. Further, once deployed, assessment of the use and value of technologies should be assessed. Such assessments should take into account local and national capacities and practicality and suitability.

Our survey of NHIM meeting participants found that the main factor that positively impacted collaboration is the affinity between agencies' goals/objectives. After that, the most important factors impacting choice of coordination partners are more pragmatic and operationally oriented, namely information management policies, technical tools, and data that the possible partner could bring to the venture.

## **DISCUSSION AND CONCLUSION**

The above projects and recommendations from the three coordination bodies signal the types of issues they face. Also, inherent in some cases are the issues faced in these projects that caused them to fail or succeed or, in the case of recommendations, cautionary notes. In the following we frame the discussion of these cases around the research questions that in general seek to delineate information management and information technology-based barriers to coordination and the actions required to overcome them.

Our first question attempts to delineate general coordination barriers, more directly associated to organizational characteristics, with those related to information management and information technology. Further it attempts to clarify the relationship between IM and IT-related barriers and organizational issues.

From the cases discussed above, compared to information technology related barriers, those associated with information management are more closely related to organizational barriers. This is primarily due to IM's relationship to organizational policies about information collection and distribution. That being said, once organizations agree to share data, problems may arise related to data structures. While data structures can also be considered an organizational issue there are issues related more directly to incompatible systems, which then cross the line into an information technology issue.

Our second and third questions aim to develop a characterization of information management and information technology coordination barriers collectively, as well as separately, identifying similarities and differences. First, actions on both information management and technology coordination can be taken that have only minimal impacts on coordination. For example, coordination body members can agree to share information but without a joint plan to analyze that information there are likely to be minimal if no effects on coordination. Similar outcomes will result when coordination body members adopt the same technology. Hence, in both areas the barriers and solutions exist in degrees.

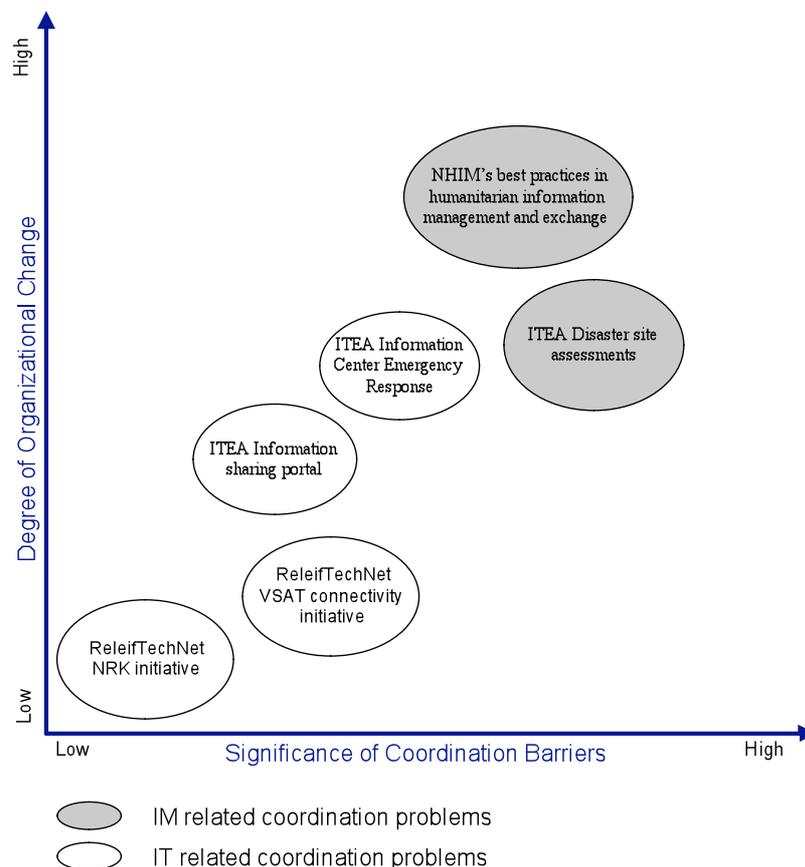
A second similarity between IM and IT-related coordination barriers is that their solutions can require a range of organizational changes. Hence, an IT-related problem such as switching database software to facilitate information sharing can require organizational changes. Similarly IM-related coordination barriers such as different definitions for fields in a database can also require a range of organizational changes. For example, adjustment in the meaning of a field of data could require information to be collected by a different part of the organization which may result in a merger between two organizational groups.

A third similarity between IM and IT coordination barriers is they can both be overcome to some extent by standards. While the term 'standards' is most often applied in terms of technical artifacts, as the NHIM recommendations show, IM relies heavily on agreed-upon definitions, processes and procedures for collecting, sharing and analyzing data.

Observed differences between information management and information technology-based coordination problems are as follows. First, due to more established models of information technology systems (e.g. the OSI model or TCP/IP stack), as compared to their IM counterparts IT managers across organizations share a common frame of reference, which can help understand and solve problems as occurred in the VSAT project. Further, information technology managers typically occupy a particular position on an organizational chart and hence it is easier to identify partners for coordination. Conversely, in the resolution of information management-related barriers there is no common frame of reference and the problems are more diffuse, nor is there often an established organizational unit to which one can propose solutions.

Second, while both IM and IT-related barriers vary in the extent to which their solutions require organizational change, information management issues typically require higher levels of organizational change. As the preceding example of merging units in the organization suggests, this is a far more extensive adjustment than is typically required by the adoption of a new platform or piece of software. This is not to say however that information technology-related coordination barriers are easier to overcome per se. They may be both easier and harder. For example, as discussed earlier, being on different technological trajectories may make coordination between two organizations nearly impossible.

As summarized in Figure 1 below, the various projects undertaken or recommended by the coordination bodies require different levels of organizational change. However, those that require high levels of change also typically represent significant coordination barriers that when overcome will bring significant coordination-related benefits (greater efficiency and effectiveness). It is noteworthy that those projects that were attempted to be implemented but failed in general require higher levels of organizational change than the successful projects.



**Figure 1 : Coordination Body Projects' Requirements and Likely Impacts**

Finally, our last question seeks to clarify the implications of these similarities and differences for the operation and effectiveness of coordination bodies. Our observations and the above cases suggest that coordination bodies that pursue problems requiring low levels of organizational change are more likely to have visible successes. This is due in part to a higher likelihood of success as well as a higher number of project partners who are drawn to the project's likelihood of success. Coordination bodies that pursue a more challenging agenda, one that aims

for information management or management of information technology in ways that require organizational change are likely to face greater challenges and experience more failures.

Hence, coordination bodies may choose to pursue a staged approach to addressing coordination barriers. At the outset a coordination body might pursue projects requiring little organizational change in its members, but then progressively transition to more ambitious projects over time. For coordination bodies in which projects are primarily identified through grass roots initiatives, this may require intervention by the coordination body staff to push members to reach beyond their comfort zone.

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