REBUILDING CONFIDENCE: TRUST, CONTROL AND INFORMATION TECHNOLOGY IN HUMANITARIAN SUPPLY CHAINS

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ABSTRACT

Donors have expressed disappointment in the performance of humanitarian organizations in responding to recent unprecedented disasters. Efforts to restore confidence have focused in part on improving transparency, accountability and capability through implementation of supply chain management information systems. This paper explores issues of trust, control and confidence in partner cooperation within the context of humanitarian supply chains. We focus on trust-building and control mechanisms linked to information technology in three areas: item specification and sourcing, material flow management and distribution to beneficiaries. Using a case study methodology, we examine existing theory and suggest extensions to accommodate the humanitarian sector.

INTRODUCTION

Humanitarian organizations address great suffering in the world, channeling aid from wealthy, developed countries to victims in every corner of the globe. While the heroic efforts of these organizations are widely admired, visible response failures to recent large disasters have shaken the confidence of donors and the general public. For example, millions of dollars of aid never reached Hurricane Mitch victims in the 1998 Latin American effort, leading to widespread criticism of respected relief organizations like Oxfam. In some cases the failures were the result of simple mistakes. In others, the failures were the result of fraud or nonperformance. After the Iranian earthquake of 2003, Iranian authorities turned back relief flights because of mistakes and clogged runways. In Sri Lanka, after the Asian tsunami, observers witnessed workers having to reload trucks on the tarmac because of poorly directed logistics efforts, slowing the flow of flights into and out of the airport (Simpson 2005). Of course, the failures are not limited to the developing world. In the US, the Red Cross came under intense scrutiny after a series of missteps including fraud (Salmon 2005), poor response to Katrina victims, and FDA concerns over its handling of blood (Strom 2005).

All of this has led traditional donors – individuals and governmental organizations – to express disappointment in the operational performance of humanitarian organizations and in the humanitarian sector as a whole. At the same time, a new set of donors, corporations, has been frustrated in its attempts to work with humanitarian organizations to get involved and make a difference (Thomas and Fritz 2006).

The question facing humanitarian executives is how to restore confidence, in particular, the confidence of large-scale governmental donors who work with them as long-term partners and provide the bulk of the funding. As the sector has begun to come to grips with this issue,

two directions for improvement have emerged. The first is to create more effective organizational structures with clear chains of command and clear demarcation of decision-making authority and responsibility. This direction comes out of the Katrina response experience. The second is to improve information management and decision-making processes in the area of supply chain management – the management of the set of activities necessary to specify, procure, transport, store and distribute relief items (Chabrow 2006, Simpson 2005). Key to this second area is much greater use of information technology and information systems that leverage and mimic technology that has long been in use in the commercial world (Spring 2006).

The management literature has argued that confidence in partner cooperation is based on some combination of trust and control (e.g, Das and Teng 1998). As humanitarian organizations specify and implement SCM information systems, they are making choices about the use of trust-building and control mechanisms to (re)build confidence. This paper explores how issues of trust, control and confidence in partner cooperation have come into play in setting IT direction for humanitarian supply chains. Through a detailed case analysis we assess how well existing theory on trust and control applies in the humanitarian setting. In doing so, we extend the theory of trust and control.

In the first section we review existing theoretical work on trust, control and confidence in partner cooperation. We then describe supply chain management in the humanitarian setting. In the following two sections we introduce the research approach and analyze SCM information system initiatives in three areas: item specification and sourcing, material flow management and distribution to beneficiaries. We conclude by discussing implications and limitations of our findings and suggestions for future research.

LITERATURE ON TRUST, CONTROL AND CONFIDENCE

Definition of Trust

Mayer, Davis and Schoorman's (1995) definition of interpersonal trust is, "the willingness to be vulnerable to the actions of another party, based on the expectation that the other will perform a particular action important to the Trustor, irrespective of the ability to monitor or control that other party." Mayer further specifies the following three characteristics of the trustee that give rise to perceived trustworthiness: 1) ability – the extent to which the trustee possesses "that group of skills, competencies and characteristics that enable a party to have influence within some specific domain;" 2) benevolence – the extent to which a trustee is believed "to want to do good to the trustor;" and 3) integrity – the extent to which a trustee is believed "to adhere to a set of principles that the trustor finds acceptable."

In contrast, recent models of trust between firms stress Mayer's second or third dimension of trust, and leave out the first (Das and Teng 1998, Kasper-Fuehrer 2001, Akkermans, Bogard, van Doremelan 2004). They respectively define trust as "positive expectations about another's *motives* with respect to oneself in situations entailing risk" (Das & Teng 1998, based on Boon & Holmes 1991), "expectation by one person, group, or firm of ethical behavior – that is, morally correct decisions and actions based on ethical principles of analysis – on the part of the other person, group or firm in a joint endeavor or economic exchange" (Kasper-Fuehrer 2001, based on Hosmer 1995), and "the belief that the other party will act in the firm's best interest in circumstances where that other party could take advantage or act opportunistically to gain at the firm's expense" (Akkermans, Bogard, van Doremelan 2004, based on McCutcheon and Stuart 2000).

For our work we have adopted the broader definition, including all three dimensions – ability, benevolence and integrity. Given our setting of inter-firm collaboration, we argue that it is important to understand not only the partner's motives and integrity, but the partner's ability to engage in successful collaboration within the problem domain, as well.

Temporality and Trust

Trust develops over time. Mayer's model of trust in an ongoing relationship incorporates constructs related to characteristics of the trustor and the trustee. While trustors vary in their propensity to trust, trustees vary in their trustworthiness (ability, benevolence and integrity). Over time, through accumulated experience, trustors learn about the trustworthiness of the trustee, based on the trustee's actions in situations of risk and vulnerability. As Meyerson, Weick and Kramer (1996) put it, the sources of trust in an ongoing relationship are "familiarity, shared experience, reciprocal disclosure, threats and deterrents, fulfilled promises, and demonstrations of non-exploitations of vulnerability." As experience and knowledge of the trustee is accumulated, reliance on the trustor's propensity to trust diminishes.

Definition of Control

We adopt Das and Teng's (1998) definition of control as "a regulatory process by which the elements of a system are made more predictable through the establishment of standards in the pursuit of some desired objective or state" (based on Leifer & Mills, 1996, 117). Control mechanisms create structure that allows the trustor to rely on the trustee without consideration of the trustee's trustworthiness or expectations of reciprocation. Control mechanisms reduce

uncertainty about the trustee's actions by putting controls on the outputs, behaviors and socialization of personnel of the trustee.

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Insert Figure 1 about here

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Das and Teng mention three control mechanisms. The first two – goal setting and structural specifications – explicitly state what is expected of partners, including "reporting and checking devices, written notice of any departure from the agreement, accounting examination, cost control, quality control, arbitration clauses and lawsuit provisions." These mechanisms may be expensive, in terms of time and resources expended, to implement and maintain. Further, they may not be effective if task complexity is high, and may even be counterproductive, if they lead personnel of the trustee to be overly simplistic in their decision-making, focus on the wrong goals, or expend excessive energy monitoring rather than doing. Nevertheless, much of operations management theory deals with the use of control to improve operations and contracting performance (e.g., Graves and de Kok 2003).

When goal incongruence and task complexity are high, a third mechanism – cultural blending – is likely to be a more effective control mechanism. Cultural blending consists of socialization and training of personnel at the trustee firm to develop common norms and values. Cultural blending has the potential to lead these personnel to voluntarily behave as desired by the trustor.

Das and Teng further argue that control and trust interact; that overly-constraining formal control mechanisms may lead personnel to feel that they are not trusted, in turn making them less trusting and possibly leading to uncooperative behaviors. On the other hand, they argue that

social control (through cultural blending) will increase trust, as it supports an environment in which decisions can be delegated and personnel can act autonomously.

Das and Teng also argue that trust has a mediating effect on control – that personnel who feel that they are trusted will accept more formal control without backlash.

Trust, Control and Confidence in Partner Cooperation

As shown in Figure 1, trust and control together determine confidence in partner cooperation. We define cooperation as "the willingness and ability of a partner firm to pursue mutually compatible interests." Absent cooperation, partner firms may take opportunistic action such as "cheating, shirking, distorting information, misleading partners, providing substandard products/services, and appropriating partners' critical resources" (Das and Teng 1998).

Both trust and control can be costly and difficult to establish. Since both trust and control serve as means to increase confidence about how the trustee will behave, firms choose what combination of trust-building and control-building mechanisms to enact in order to increase confidence to a desired level. Thus, trust and control act as supplements (Das and Teng 1998).

SUPPLY CHAIN MANAGEMENT IN THE HUMANITARIAN SETTING

Humanitarian organizations are the primary vehicle through which governments channel roughly $6 billion in annual aid targeted at alleviating suffering caused by natural and man-made disasters. These disasters may be either sudden onset or slow onset (see Table 1).

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Insert Table 1 about here

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Characteristics of Humanitarian Supply Chains

Humanitarian supply chains typically create a bridge between the world's wealthiest countries, where most of the funding originates, and the world's poorest, where most of the world's disasters occur. Large governmental donors exert a strong influence over the sector, as they provide the bulk of the funding for major relief and development activities. Prominent among these donors are the United States and the European Union, whose contributions have represented roughly 33 percent and 10 percent of total humanitarian aid, respectively, in recent years (Thomas and Kopczak, 2006). More than 94% of the world's major natural disasters between 1990 and 1998 and greater than 97% of natural disaster deaths occurred in developing countries. These countries shouldered two-thirds of the economic losses during that time frame (World Bank 2001).

The humanitarian context differs from the commercial context in two important ways. First, humanitarian organizations must at all times act in accordance with humanitarian principles of humanity, neutrality and impartiality. This means that they will prevent and alleviate suffering, wherever found; will not influence the outcome of a conflict with their intervention; and will not favor one group of beneficiaries over another (IFRC 2007). Second, since humanitarian "consumers' (beneficiaries) lack voice, there is no direct market mechanism to punish (reward) ineffective (effective) organizations. While donors, like stockholders, do care about the effectiveness of the organizations to whom they entrust their money, they receive limited information about the effectiveness of their partners.

How do humanitarian supply chains compare to commercial supply chains? Humanitarian supply chains deal with perhaps the most challenging requirements of any; they must be "multiple, global, dynamic and temporary" (Van Wassenhove 2006). For example the

International Federation of the Red Cross responds annually to an average of sixty international disasters in roughly as many countries (IFRC 2007). With initial disaster response efforts lasting 90 days and development grant periods of one year, the nature of SCM is an ongoing process of setting up, scaling up and closing down supply chains around the globe. Furthermore, new supply chains must respond and adapt rapidly to the unfolding chaos under difficult conditions in the aftermath of a disaster. Businesses seeking to improve their *agility*, *adaptability* and ability to *align* the differing needs and dynamic roles of many players (Lee 2004) could learn from emulating the strengths of humanitarian supply chains (Van Wassenhove 2006).

Apart from these strengths, an underinvestment in and lack of appreciation for logistics over time has led to a gap in capability vis-à-vis commercial supply chains (Kopczak and Thomas 2005, Van Wassenhove 2006). This gap may be characterized by the following five "pain points" (Thomas and Kopczak 2006):

1. Lack of recognition of the importance of logistics
2. Lack of professional staff, accompanied by high field staff turnover
3. Ineffective leveraging of technology
4. Lack of institutional learning
5. Limited collaboration among humanitarian organizations.

Aid Agency Perspectives on Information Systems

Humanitarian organizations vary widely in the level of centralization of their organizations and in their approach to the use of information systems. This is illustrated in the following excerpt from a 2006 study of aid agency perspectives on information systems (Currion, 2006), included below as Figure 2. The excerpt applies to information systems of all

types, and not specifically to SCM information systems. The study is an output of the Emergency Capability Building (ECB) Information Technology Requirements (ITR) initiative. The initiative is being pursued by the Interagency Working Group on Emergency Capacity, which includes seven members: CARE International, Catholic Relief Services, International Rescue Committee, Mercy Corps, Oxfam GB, Save the Children – US and World Vision International (Wright 2006).

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Insert Figure 2 about here

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RESEARCH APPROACH

This research examines existing theory on trust, control and confidence in partner cooperation in a new setting – the humanitarian context. The use of a case study approach has allowed us to investigate a complex phenomena with rich detail (Eisenhardt 1989, Yin 1989), while providing structure and focus by starting with *ex ante constructs* (Eisenhardt 1989) that come from the existing literature.

This research employed an action research design (Reason and Bradbury, 2000). The research took place at Aidco (a disguised name), a large NGO that runs development programs and emergency response operations in over 40 countries. The authors have been actively involved at Aidco as consultants for six months, evaluating and making recommendations related to Aidco's supply chain management processes, information systems and initiatives. As consultants, we had greater access to sensitive information and were allotted more time with personnel, as well as a site visit to Sudan. This allowed us to gain a more detailed understanding

of a complicated situation, one which was first described to us by a member of the IT staff as “a mess” (referring to the complexity of the issues to be sorted out). It also worked to ensure relevance of the research by linking it to an investigation of strategic importance to Aidco that was well-supported by management (Gill, 1983).

To ensure adequate levels of reliability, we have triangulated data from several sources and have used an iterative process of data collection, analysis, reflection and synthesis (Yin 1989). One author acted as the primary researcher and analyst; the other (who was less involved in the data gathering) acted in a *peer review* role (Miles and Huberman, 1984).

Data collection and analysis took place during the period July 2006-January 2006. Sources of data included interviews, a written questionnaire, visits to the US home office, a visit to a UK affilicated office, and a site visit to the Sudan Country Office. A series of interviews, with follow-up, were conducted with employees from the Home Office representing development programs, emergencies, food commodity management, finance, regional program management, IT and internal auditing. Several people with extensive experience as logistics managers for emergency response operations in Indonesia, Pakistan, Afghanistan, Sudan and Lebanon were also interviewed. An extensive written questionnaire dealing with current supply chain processes, use of information systems and needs for future systems, was completed by eight Country Offices. The nine-day visit to Sudan encompassed a review of Country Office and impact area supply chain processes and use of information systems. People from supply chain functions, IT, grant compliance and program management were interviewed. During the study period of six months, we interviewed over 45 individuals representing operations in over 9 counties.

CASE ANALYSIS

Aidco Organization

Aidco is organized with a US headquarters (HO = home office) and over forty country offices (COs) worldwide. Emergency response has become a much larger part of Aidco's work in recent years, accounting for about half of revenues. As a result, Aidco has been wrestling with how to best organize to support both development programs and emergency response. Aidco's activities fall into five areas: Economic Opportunities, Education, Emergencies and Protection, Health, Hunger and Malnutrition and U.S. Programs.

Aidco mobilizes roughly $100M of food and Non-Food Items (NFIs) annually. While Aidco operates in over forty countries, many of those operations are small. The countries with the largest spend on food (FY '06) are Sudan, Pakistan, Indonesia, Ethiopia, Bangladesh and Bolivia. Those for NFIs are Pakistan, Sudan, Iraq, Malawi, Philippines and Indonesia. Aidco has distributed food on a consignment basis directly to beneficiaries on behalf of other organizations, such as USAID, USDA and World Food Program (WFP), since the late 1980's.

Non-Food Items procured by Aidco include assets such as vehicles, communications equipment and computers; supplies such as building materials, tents, plastic sheeting, books, water/sanitation equipment, and healthcare supplies for clinics; and items such as blankets and household sets for distribution to beneficiaries. Aidco has no centralized procurement organization; NFIs are procured by Country Office staff locally (whenever possible) or internationally (when no suitable local source exists).

Country Office organizations are headed by a Country Director and a Deputy Country Director. The Finance Director is responsible for handling cash, keeping the books and charging expenses to the appropriate grants. CO supply chain management functions, such as

procurement, transportation and CO warehousing may report into an Operations Manager (if there is one) or may report into Finance. These positions are typically held by expatriate employees. The impact area organization, which is a mix of expatriate and local staff, reports into the CO.

The Trust and Control Issue

Confidence of large donors in their partner, Aidco, *and* in its Country Offices to execute development programs and emergency response operations is critical to continued support. It is Aidco's Home Office, and not the Country Offices, however, that is responsible for fundraising, donor relations, the Aidco brand and the overall quality of its work worldwide. Thus, it is the Home Office, and not the Country Offices, that feels the pressure to address this issue.

Action on the issue requires trustbuilding and/or institution of controls both externally (between donors and Aidco) and internally (between the HO and the COs). As the party "in the middle," Aidco's HO is negotiating these internal and external considerations in setting its course.

As a decentralized organization historically engaged mainly in development work, Aidco and its donors have, until recently, relied on trust of the COs, and on social control, with a limited amount of output and behavior control. With the advent of several major disasters, donors and Aidco have engaged in increased risk-taking, which creates a need for greater confidence, be it based on trust or control. At the same time, there has been a loss of confidence, due to (perceived) poor performance by the sector as a whole.

Aidco's goal is to improve its emergency response capability and to evolve into an organization which effectively handles both development programs and emergency response.

The key to achieving this goal is organizing for disaster preparedness, while maintaining or increasing efficiency and effectiveness of development programs. Disaster preparedness involves creating the means to quickly bring in a team and process from outside the country, while shifting and scaling up the Country Office's resources and processes. As response occurs, the Country Office must shift from autonomy to collaboration, while scaling up its resources. As one logistician described it, "In Afghanistan we had to transform from a $3 million office to a $30 million office overnight."

As Aidco considers implementation of SCM information systems, issues of trust and control arise both from the point of view of supporting capability – the level of ability of development programs and emergency response operations to provide effective and efficient relief and development – and accountability and transparency – the communication of information on Aidco's actions and outputs. Even as Aidco increases capability, accountability and transparency, however, control will be limited and there will still be a need for donor trust in Aidco's ability, benevolence and integrity.

SCM Information Systems – Current State

In contrast to large multi-national corporations, Aidco does not employ a SCM information system anywhere in the world, nor does it employ any related functional information system, such as a procurement module or warehouse management system. While some detailed information on materials and freight is tracked for grant or operation-level reporting purposes, nothing is rolled up. While the HO tracks dollars spent by country by account (assets, supplies, freight, etc.) via the financial system, neither the HO nor the COs have a system to consolidate and track materials management information.

Based on our interviews, Aidco's attitude towards systems lies on the "entrepreneurial" end of the entrepreneurial – corporate spectrum, as described in the Interagency Working Group Report (Currion 2006). To recap that report, the attitude can be characterized with the following observations: "Location of authority within organization varies depending on circumstance; Higher level of autonomy but lower level of support to country offices; Generates new ideas more easily, but has difficulty applying systems consistently throughout the organization; More flexible approach to address short-term problems as they arise; Learn through transfer of staff."

In any case, the potential for implementing systems is constrained by the ability of the receiving organization to use the technology, in terms of availability of infrastructure (electric power, Interrnet and phone service) and technical support; technical sophistication of potential users; and security of the site. While all COs are able to support the use of systems, availability of technical support may limit the extent of use and/or the ability/speed of implementation. A financial accounting system has been rolled out to all COs; while many offices submit their end of month reports to the HO via the Internet, many others submit by mailing in a CD. Impact areas vary greatly in their suitability for system implementation; urban areas are generally the most capable.

CO Processes – Development Programs

Aidco's approach to SCM process development has been to have the Home Office provide guidelines for forms and procedures to the Country Offices and to allow the COs to develop and document their own processes based on these guidelines. COs also consider donor reporting requirements in developing their processes. An internal auditor periodically visits the

CO to perform an accounting audit, verifying, for example, the integrity of bidding processes and the creation of an audit trail for transactions.

COs typically use Microsoft Word or Excel software to create forms, which are then filled in by hand. Forms used are similar to those used in the commercial world, e.g., purchase requisitions/orders, bills of lading, goods received notices, warehouse withdrawal requests. The most advanced COs use Microsoft Excel for tracking purposes, e.g. for tracking assets or purchase orders.

Warehouses generally use stock cards to track inventory. The most advanced warehouses maintain an inventory list in Excel. Program managers typically have a laptop computer. Some program managers track open purchase orders and items in stock using Excel.

REDI Team Processes – Emergency Response

During the initial phase of the emergency response, a team of international personnel (refereed to as the RIDI team for Responding to Emergencies and Disasters Internationally) travels to the impact area, where they conduct the assessment and initiate operations. The nature of the CO involvement in the initial response varies, based on what supply chain-related knowledge and resources it can usefully provide to meet the needs of the emergency response operation. It may be that the impact area is in a location for which the CO has limited knowledge.

The forms, spreadsheets and procedures that the REDI team logistician uses may be those that he or she has used in past emergency response operations, those from the local CO or some combination of the two. During the initial phase of the response, the REDI team may bypass

some guidelines. For example, he or she may solicit only a single bid rather than the standard three bids or may place orders by phone, failing to create the standard audit trail documents.

Donor Reporting

Donors require reports that indicate what was done, for example how much food or blankets were distributed; how many new schools, clinics, latrines or wells were established; and how many beneficiaries were served. Report generation often requires tallying up numbers from documents such as bills of lading or beneficiary distribution logs. Reports correspond to a particular grant or response operation.

SCM Information Systems for Food

One area in which Aidco is implementing a standardized approach across multiple COs is warehouse management for food commodities. Aidco is rolling out a simple inventory management and reconciliation application that was developed at its Bolivian CO to other COs who make frequent distributions of food and have the capability to support it. The package is designed to facilitate the reconciliation of warehouse flows that is required by World Food Program, one of three organizations that consign food to Aidco. Warehouse management for food items is simplified by the fact that there are typically fewer than ten food commodities to track in a given country.

Analysis of SCM Information System Initiatives

Aidco is starting to work towards implementing a SCM information system of some sort in the field (COs and impact areas). As Aidco proceeds, issues of trust and control will come

into play. This section discusses these issues as they relate to the overall strategy and as they relate to three potential areas in which SCM information systems could be implemented.

The shift towards emergency preparedness requires that the HO-CO relationship shift from one of relative autonomy to one of collaboration. Gray (1985) defines collaboration as "the pooling of appreciations and/or tangible resources, e.g., information, money, labor, etc., by two or more stakeholders to solve a set of problems which neither can solve individually". Aidco is taking first steps in establishing collaboration with its COs (and possibly involving its donors) on a problem which it has not tackled before: how to effectively institute SCM preparedness in its offices worldwide, while maintaining or improving the effectiveness of its development programs.

Organizations engaging in collaboration develop collaborative structure through three sequential phases: problem-setting, direction-setting and structuring (McCann 1983). Collaboration will require increased trust, because the task is one of reciprocal interdependence (Kumar and van Dissel 1996). At the same time, going through the process of establishing collaborative structure can be expected to increase the HO's trust (benevolence and integrity) in and social control of the COs (Kopczak and Johnson 2006).

However, the potential for using control to build confidence will continue to be limited by a lack of goal congruence between the HO and COs and by complexity. While collaboration will improve goal congruence and standardization of processes will reduce complexity, goal incongruence and complexity will remain high. Thus, there will always be a need for trust.

As will be seen in the discussion of the three areas of initiatives, the thrust of the initiatives is to increase the HO's output and behavioral control of the COs. There was little evidence in the interviews of intent to initiate trust-building mechanisms, except as a means to

get the COs to accept and use the new technology. This seems to be a paradox, that just as Aidco is shifting to an increased focus on emergency preparedness, which is more complex and therefore less amenable to control, we observed that Aidco is choosing to put significant resources towards increasing control, with little new effort towards trust-building.

A potential explanation for this lies in the idea of whether or not confidence-building measures are hierarchical; that is, to what extent do confidence-building measures in one part of the hierarchy (HO-CO) carry through to the next higher level (donors-HO/COs). We assert that, while control-oriented measures are hierarchical (to the extent that they are based on accountability and transparency), trust-building measures are not. Neither observations of risk-taking, equity preservation, communication and mutual adjustment between the HO and COs nor statements from the HO about an increased trust in the CO are likely to carry much weight in swaying donors to increase their trust in the COs.

We turn now to three areas in which Aidco is considering SCM information systems initiatives. As detailed in Table 2, each of the three initiatives addresses a unique trust and control question. As Aidco defines a technology roadmap, it will set priorities and timeframes for these initiatives, based on the projected benefit of addressing that trust and control question and the feasibility of and resources required to implement a system that can address the question.

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Insert Table 2 about here

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Item Specification and Sourcing

This initiative addresses the question of how to assure that (build confidence that) Aidco is specifying the right items and sourcing the items from the best possible source. Ideally, Aidco

would develop an item catalog and qualify a set of suppliers for the items for which it anticipates a need. Several things make this difficult. First, the item must be suitable for use in the impact area location in which it will be used, which could be anywhere (for emergencies). Second, the requirements of a particular emergency cannot be anticipated exactly. Third, in cases of international supply, customs clearance considerations must be considered. These are intricate, idiosynchratic to particular countries and changeable. Fourth, local markets evolve over time and may be disrupted when disaster occurs. Last, to specify and source well requires combining knowledge from program/operations managers, technical experts and procurement specialists.

A SCM information system can help by organizing information and making it visible to multiple parties, be it information about recommended items and their specifications, recommended suppliers or history of item purchase/use. It can also expedite the sourcing process and communication Aidco's HO and field personnel and suppliers. And it can provide accountability and transparency to the HO and donors through some combination of observation and reporting. A very sophisticated system could also document the decision-making process, increasing accountability still further.

There are several challenges to implementing such a system. First, to gain full advantage of a global system would require that Aidco coordinate nomenclature and specification of items across countries. This would require a huge collaborative effort. Second, HO and donors would have to build trust in the ability and commitment of the field personnel to use the system. This new requirement of trust is typical of what Kipnis (1996) calls "third-stage technology". The need to maintain competence in a workforce characterized by very high turnover (Currion 2006) would increase the complexity of staffing. Third, it is likely that the system would not be flexible, comprehensive and timely enough to handle many of the specification and sourcing

decisions that arise during a unique emergency situation. Last, a full system might be too "heavy" in an emergency situation, resulting in slower decision-making.

Material Flow Management

This initiative addresses the question of how to assure that Aidco manages in-country materials well, insuring that they flow in a timely manner and with minimum risk to the point of distribution. It includes implementation of systems to support the purchasing, transportation and warehousing functions, as well as tracking and tracing of material as it moves through the pipeline. These SCM information systems modules would automate and record materials transactions, providing real-time visibility of the pipeline of materials and a history of the flow of materials.

Aidco will focus on the other two initiatives first before pursuing this one, for two reasons. First, the trust and control issues that the other two initiatives address are of higher priority. They address the issue of what relief was distributed and with what impact, whereas this initiative deals with Aidco's internal processes and how well they work. Second, pursuit of this initiative would require implementing fairly complicated systems in both the CO and impact areas. The impact areas vary greatly in their readiness to accept complex systems, from several points of view: infrastructure, capability of user personnel and availability of technical support. This becomes even more of a challenge in emergency response situations, when new setting up new warehouses amidst chaos.

Distribution to Beneficiaries

This initiative addresses the question of how to assure that Aidco distributes relief items and services fairly and with maximum impact. It involves collection, analysis and reporting of information on beneficiaries and Aidco's interventions. Aidco faces rising donor expectations, both for real-time, detailed reporting of distribution quantities and for timely, comprehensive impact assessment (Currion 2006).

While the traditional process is paper-based, Aidco has recently begun using personal digital assistants (PDAs) in some locations. The PDA battery allows up to three days of operation, making it suitable even for the most remote locations, in which there is no source of power. Aidco workers enter information about beneficiary registration and about distribution of items and services directly into the PDA, making it immediately available for analysis or donor reporting. This allows Aidco personnel to use beneficiary information to improve program design (tailor the services to better meet the needs of specific beneficiaries), to order quantities of relief items based on current information rather than estimates, and to monitor program results and impact on a real-time basis. Thus, use of a PDA improves capability, accountability and transparency.

PDAs have been used in food relief and in health care programs in countries such as Bangladesh, Bolivia and Haiti. In Bangladesh the program serves more than a million beneficiaries. They work well in collecting simple, structured data and when numbers of beneficiaries are high. In a number of cases, Aidco has chosen not to use PDAs after observing negative reaction from impact area personnel and beneficiaries to the technology.

DISCUSSION

Through this case study we have examined issues of trust, control and donor confidence in a global humanitarian organization that is pursuing the use of SCM information systems to improve capability, accountability and transparency of field activities. Unique aspects of the setting include: 1) the role of donors, rather than customers, as funding agents; 2) the need to abruptly shift the organization to a dramatically increased emphasis on emergency preparedness and response, an activity with high task complexity and low HO-CO goal congruence; and 3) the current reliance on manual processes, rather than information systems.

We found that while Aidco historically depended on trust, it is emphasizing control, rather than trust-building mechanisms as the means to build donor confidence. While improving capability is perceived as a "bonus" benefit, the major justification for systems implementation is accountability and transparency to donors. Trust-building between the HO and COs has been contemplated solely as a means to increase receptiveness of the field to implementation of systems.

The case findings suggest the following extension to existing theory. The use of temporary or permanent control mechanisms may increase trust indirectly, by providing proof of trustworthiness and/or by providing information which feeds into capability building efforts (Lee and Billington1992). By demanding real-time reports of quantities distributed and impact, donors provide humanitarian organizations an opportunity to furnish proof of ability-based trustworthiness. This notion fits well with process capability theory.

The case findings raise the question of how do or how should organizations in a supply chain make decisions about the balance between the use of trust-building and control mechanisms in building confidence in partner cooperation. While current literature argues that

organizations choose based on an understanding of cost-efficiency, we saw no evidence of Aidco performing this type of analysis.

This question is particularly interesting for a multi-stage supply chain (hierarchy) such as this one. We propose that control is hierarchical (transfers through multiple hierarchical levels), but that trust must be built at each level. Trust of the HO in the COs does not transfer to donors. Furthermore, while the existence of control mechanisms can be observed over time, the existence of trust-building mechanisms is more difficult to track. This could be an area for further research.

We have examined trust and control between a humanitarian organization and a large and involved donor. Like the type of alliances analyzed by Das and Teng (1998), one important contingency is nature of the relationship between the donor and the humanitarian organization. In particular, the relationship type seems most closely related to the size and structure of the donor. Very large donors like government agencies (e.g., USAID) or foundations (e.g., Bill & Melinda Gates Foundation) enter into the types collaborative relationships with humanitarian organization that we examined in this paper. They typically have very strong interests in the nature and operation of the relief effort and are more likely to experience issues like goal incongruence. However, not all donors desire or are capable of such meaningful collaboration. For example, smaller foundations or corporate givers tend to make gifts with expectations of humanitarian organization's performance, but without substantial collaboration expectations. Even within this group there is a spectrum of relationships. For example, a large pharmaceutical firm may have specific expectations about a humanitarian organization's drug distribution efforts beyond simply delivering the goods to those in need. They make gifts-in-kind with very specific goals, such as relieving the suffering of needy recipients in a certain country while confining the distribution to

that specific region (to avoid the creation of grey markets or to limit the loss in revenue in a country market). At the other end of the spectrum (Figure 3), individual donors from the general public may have very little collaborative expectations. Interestingly, one might argue that individual donors with stronger collaborative interests may organize into donor groups to enter into a more substantial relationship (e.g., through the United Way or a church denomination).

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Insert Figure 3 about here

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We note that recent interest in corporate giving through corporate citizenship initiatives (Thomas and Fritz 2006) may result in higher expectations in the nature of the collaborative relationship. For example, firms like Cisco or Intel donate in different ways including money, in-kind equipment gifts, and people expertise. With these donations often comes a higher level of direct involvement in the humanitarian organization and higher expectations on the level of collaboration, which may change the mix of trust and control in the relationship.

Alternative explanations for the current emphasis on control are 1) that control has been underutilized in this sector because of constraints on funding (which are now being loosened); 2) improved technology is making use of control more cost-effective; and 3) new corporate donors, who are biased towards approaches that they use in the commercial world, are wielding influence.

There are several limitations to this study. The case study was conducted at a single humanitarian organization that operates with a decentralized organization. It would be helpful to repeat the case study at a more centralized organization. It also would be useful to conduct a case study of a leading donor, to collect data directly on their motivations and perceptions of the

use of trust and control. That said, it is our observation that in general, the leading (large) humanitarian organizations all face these issues of trust, control and rebuilding donor confidence while stepping up to the challenge of increasing disaster preparedness.

This suggests an additional area for further research – the rise of consortium-based efforts to enhance information technology in the humanitarian sector, such as NetHope, Fritz Institute and the Emergency Capacity Building Project, and the way in which their initiatives complement single-organization initiatives in affecting trust, control and donor confidence.

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	Natural	Man-made
Sudden onset	Earthquake Hurricane Tornado	Terrorist Attack Coup d'Etat Chemical Leak
Slow onset	Famine Drought Poverty	Political Crisis Refugee Crisis

Table 1. Explaining disasters. (From Van Wassenhove, 2006.)

	Central Trust/ Control Question	Functions Involved	Knowledge Requirement
Item Specification and Sourcing	Right items from best possible source	CO procurement, program /operation management and technical expert	Program needs, technical requirements, international and local supply options
Material Flow	Timely material flow with minimum risk to point of distribution	CO procurement and transportation, impact area warehousing and transportation	Up-to-the-minute information on program needs and transport options
Distribution to Beneficiaries	Fair distribution with maximum impact	Impact area program management	Program/beneficiary needs, beneficiary registration, availability of items

Table 2. Summary of Three Areas of SCM Information Systems Initiatives

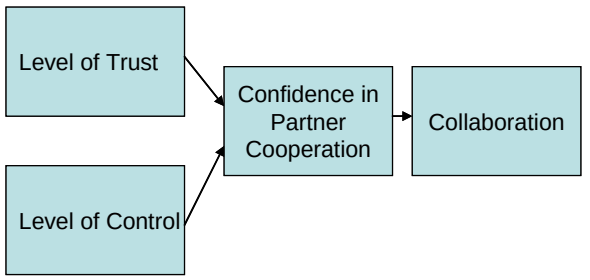


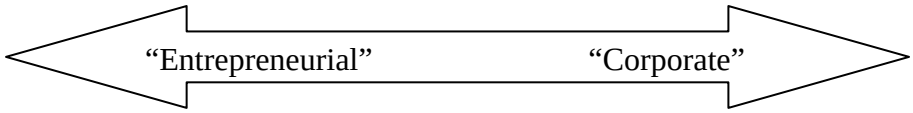
Figure 1. Trust and Control as Facilitators of Collaboration (based on Das and Teng 1998)

Snapshot: Organisational Attitudes within IWG Agencies

During the assessment it became clear that IWG agencies differed significantly in terms of the way that they did business, particularly since, as agencies grow, they need to institute more – and better – systems to manage their work. This difference is only partly related to organization size (in terms of staff or turnover) and is more often a reflection of how the organisation sees itself. Generally, development of agency culture is a self-fulfilling process; in particular, international staff choose to work for agencies that reflect their own beliefs about how their work should be carried out. However cultures are not fixed and may even vary within organizations, especially between countries or regions where different working cultures may apply.

In the case of NGOs, the critical factor seems to be how an organization perceives the relationship between headquarters and field, particularly the amount of autonomy afforded to country offices. Figure 2 shows a spectrum of attitudes, along which it is possible to place agencies in general terms. At one end of the spectrum is an "entrepreneurial" attitude, at the other end a "corporate" attitude (note that these terms are used descriptively, rather than literally).

Figure 2. Agency Perspectives on Information Systems



• Location of authority within organization varies depending on circumstance; • Higher level of autonomy but lower level of support to country offices; • Generates new ideas more easily, but has difficulty applying systems consistently throughout the organization; • More flexible approach to address short-term problems as they arise; • Learn through transfer of staff.	• Location of authority within organization clearly defined and known; • Lower level of autonomy but higher level of support to country offices; • Able to apply systems consistently throughout organization, but harder for innovation to arise; • More consistent approach to address long-term problems after analysis; • Learn through transfer of systems.

Interview responses and my own observations during the assessment led me to note that IWG agencies generally see themselves moving from left to right on this chart, although they are at different stages on the journey. This chart was quite controversial when it was first presented to the ECB ITR Initiative advisors, but it must be emphasized that there is no value judgment implied, and that this is only one aspect of organizational development and culture.

Moving from left to right across the chart, agencies tend to have more and better information systems. However, the ability to develop and replicate systems comes at a price: it becomes

harder to create new tools to deal with problems within the agency. To some extent, this chart mirrors the choice that all emergency response organizations must make between "agility" and "discipline" – there are advantages and disadvantages at any position on the scale. This has relevance to the ECB ITR Initiative because it is important to understand the dynamics of collaboration in systems development. When we discuss how agencies might collaborate, their different positions on the chart mean that they vary considerably in their understanding of what constitutes an information system, what they expect from such a system, and their capacity to implement such a system. This has ramifications not just for the ECB ITR Initiative, but for the entire ECB project and all collaboration in this sector.

Figure 2. Excerpt from Currion, P. 2006. ***Information and technology requirements assessment: global response***. Report of the Inter-Agency Working Group, ECB Project.

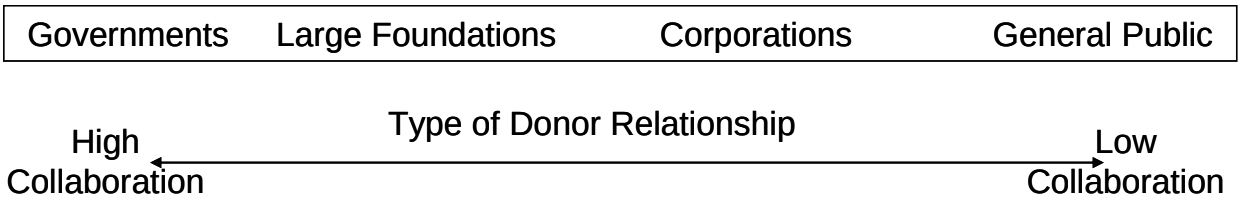


Figure 3. The Spectrum of Donor Relationships