

# Building Response Capacity through Cross-boundary Information Sharing: The Critical Role of Trust

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**Abstract:** Governments around the world are increasingly turning to information sharing and integration to help solve problems in a wide range of programs and policy areas. These complex interorganizational efforts face not only the technical challenges of many information technology initiatives, but also the difficulties derived from interacting among multiple and diverse organizations. Trust has been identified as one the most important organizational factors for cross-boundary information sharing and integration. However, more research is needed regarding the determinants of trust building in this multi-organizational contexts. This paper highlights the relevant role of trust in cross-boundary information sharing initiatives and provides evidence about three of its most important determinants.

## 1. Introduction

Governments around the world are increasingly turning to information sharing as a lead strategy for developing response capacity for problems in a wide range of programs and policy areas. As information sharing is pursued, the complexity of this strategy is becoming clear. Developing cross-boundary information sharing to support government response capacities requires change, in some cases, significant changes in organizational and technological processes. These changes are influenced by specific types of social interaction, which take the form of group decision-making, learning, understanding, trust building, and conflict resolution, among others [1-4]. New research examining the nature of these social interactions and the influence of these interactions on information sharing as a response strategy is called for. Trust building, in particular, is an important social process for developing cross-boundary information sharing among organizations and individuals.

Previous research has shown the importance of trust and trust building for cross-boundary information sharing initiatives. Much of this work has focused on the specific risks to trust in an information-sharing context. These risks include losing control over highly valued organizational information and knowledge, the possibility that information disclosed is misused against the interest of the organization or individual who made the disclosure, the potential imbalance of the knowledge exchange itself, and the transaction costs and uncertainty associated with the interdependence that may result from cross-boundary information sharing [5].

Little attention, however, has been paid to the determinants of trust in this complex context. This paper expands our current understanding of these determinants and provides a grounded theory of how trust is built in multi-organizational settings. A comparative analysis of four case studies is used to examine this question.

This paper is organized in five sections including these introductory comments. Section two provides a review of current literature about the role of trust in information technology projects and about determinants of trust. Section three presents the research methods and a brief description of the cases. A brief discussion of the role of trust in these initiatives is then presented as a backdrop for a more detailed discussion of the determinants of trust and the introduction of three propositions about trust building. Finally, section five contains some concluding remarks including the practical lessons of this study and future areas for research

## **2. The Role of Trust in Cross-boundary Information Sharing**

Trust building is both a key factor for developing cross-boundary information sharing and, in a much broader sense, is an important element of the social capital needed for any type of successful cooperation or collaboration within and across social networks [6-8]. Social capital are the active connections among people that bind the members of human networks and communities and make any type of cooperative action possible [9]. The levels of social capital needed to coordinate action or achieve desired goals depend on the complexity of the interaction among the organizational and technical processes involved. For cross-boundary information sharing, this complexity refers not only to intraorganizational processes, but also to interorganizational collaboration and overall interaction.

Therefore, the complexity of developing cross-boundary information sharing requires not only technological capabilities but also organizational capabilities in the form of various types of social interaction. Technical and organizational processes and behaviours have been found in some cases to change radically for the individuals and organizations involved [10-12]. From a technical perspective, system designers and developers must regularly overcome problems related to the existence of multiple platforms, diverse database designs and data structures, highly variable data quality, and incompatible network infrastructure [13-15]. From an organizational perspective, these technical processes often involve new work processes, mobilization of limited resources, and evolving interorganizational relationships [16-19].

Previous studies of collaborative efforts have found that the level of trust among participating organizations is particularly relevant because it can alleviate conflicts and ease the way for risk taking, organizational change, and cross-boundary decision making [5, 12, 20]. Levels of trust have been shown to influence the levels of participation and knowledge sharing among participants in a cross-boundary information sharing effort [21]. More specifically, in some cases a low level of trust can contribute to a contentious and unfavorable setting for exchange of even basic information. In other cases, a high level of trust can contribute to full participation in the project and a high level of knowledge sharing about complex business processes and practices [21]. Thus, trust plays a key role in cross-boundary information sharing initiatives and collaboration efforts in general.

## **3. Determinants of Trust in Cross-Boundary Information Sharing**

In spite of substantial barriers, trust relationships can emerge and grow, fostering productive interorganizational relationships and knowledge sharing [5]. Moreover, there are important factors that foster trust in cross-boundary information sharing initiatives. Previous studies have shown that the combination and more importantly the interaction of leadership, organizational culture, and formal structures to support knowledge sharing and cooperation over time ease the way for trust development [5, 10, 12]. Conversely, previous research on trust in cross-boundary information sharing initiatives has shown that a low level of trust may exist due to the existence of competitive relationships among the agencies involved, lack of leadership, and absence of formal structures to support cooperation [5].

## **4. Research Methods and Description of the Cases**

This study uses a case study methodology encompassing documentation analysis and semi-structured interviews. Interviews with public managers and other actors involved in two criminal justice and two public health cross-boundary information sharing initiatives at the state and local level were conducted to form the initial model. The interviews addressed critical factors and processes involved in integrating information across levels and agencies in government and how those factors and processes varied for different types and degrees of integration.

Interviews were transcribed and analyzed following an inductive logic and using grounded theory techniques [22, 23]. Atlas.ti, a qualitative analysis software tool, was used to support coding and analysis activities. Trust and trust building emerged as among the most important topics in the analysis. Propositions about the determinants of trust relationships were generated and refined.

### *4.1 Response to West Nile Virus*

In late summer and early fall of 1999, the US began to experience the first outbreak of West Nile virus (WNV) in the Western hemisphere. The first cases appeared in New York State (NYS). In 2002, the State of Colorado experienced its first case of WNV and reported one of the highest number of human cases in the country for that year.

A critical component of NYS' response capacity was the development of a web-based state-wide integrated information network. This network, led by the New York State Department of Health, would collect and disseminate WNV related case data on mosquitoes, animals, and humans through the Health Information Network (HIN). The first case of WNV in Colorado in 2002 occurred in Larimer County. The County Health Department was responsible for coordinating the response. This response included a cross-boundary information sharing initiative characterized by an interorganizational process of collecting, disseminating, and analyzing information from a disparate group of information providers and users.

As New York and Colorado worked to build response capacity they turned to information sharing as a lead strategy. In both states the response required animal and human public health professionals who were unaccustomed to collaborating across traditional government boundaries to work together. Healthcare facilities that spanned state, local, and federal jurisdictions were required in the response effort as well.

### *4.2 Criminal Justice Information Integration*

Information sharing has for many years been a strategy employed by the justice community. Post September 11, 2001 however, has increased both the stakes in and the expectations of integrated justice efforts. New York State and Colorado are among the many states pursuing new levels of information sharing as a lead strategy in building response capacity.

Colorado is generally seen as the leader in integrated justice in the U.S. The Colorado Integrated Criminal Justice Information System (CICJIS) began operating in 1998. The system facilitates the sharing of data between five state-level criminal justice computer systems. Government Technology Magazine rated CICJIS #1 in the country for Technical Integration in the Criminal Justice Arena in 2002. Since September 11th, Colorado has worked hard to take the CICJIS cross-boundary information-sharing model and expand it throughout the state and local criminal justice communities and even apply it beyond criminal justice to such broader areas as homeland security.

New York represents one of the more complex justice environments in the U.S. In October 1999, the New York State Division of Criminal Justice Services (DCJS) introduced

eJusticeNY. eJusticeNY leverages internet technology, to create a single point through which police, court and other authorized personnel can access a broad range of criminal case related information. In 2003, the NYS Webmasters Guild awarded DCJS the "Best of the Web" Award for the system. Also in 2003, the Director of the NYS Division of Criminal Justice Services called on all of the state criminal justice agencies to work together to determine the best way to expand the eJusticeNY information-sharing model to more criminal justice agencies to include local governments.

## **5. Analysis and Results**

This section presents the main results of our analysis; highlighting the importance of specific factors and their influence on building trust in cross-boundary information sharing initiatives. Our results show several consistent and crucial relationships between trust and three organizational factors; clarity of role and responsibility, respect for autonomy, and exercise of authority. Although the main focus of the paper is on the determinants of trust, it is important to note that the cases also provide evidence supporting previous research on the effects of trust on cross-boundary information sharing. The sections below first provide a brief discussion of the impact of trust on the cross-boundary information sharing as a backdrop for the propositions; the subsequent sections introduce the determinates of trust found in the cases and present the related propositions.

### *5.1 Trust and Cross-Boundary Information Sharing*

One of the important ways trust has an impact on cross-boundary information sharing is through enabling good communication and collaboration among participating agencies.

[getting] people to participate truthfully as to what can be done versus what should be done. The approach we're using now is let's talk about starting an enterprise from scratch with shared functions and talk about what can technically be done [...].

Trust can be the catalyst to more effective and neutral conversations, as well as for less friction among organizations during the collaboration process. However, scepticism also plays a role.

I saw in the people who were coming to the table initially kind of a guarded approach to this whole come together and put our ideas, our hopes and fears out on the table. And I think several of them and maybe perhaps half of those sitting around the table were extremely cynical and had that, you know, we're coming to these meetings and maybe something will come out of this and we'll get something down on paper but this will never become reality [...] We were all looking at our agency neighbour next to us, not quite sure what to do next or wonder how much should we trust these guys.

Involving participating agencies in specific strategies and decisions that foster trust across boundaries was found in these cases to be instrumental to the success of these efforts. Three of these specific strategies or factors were identified in our case studies and are presented next.

### *5.2 Clarity of Roles and Responsibilities and Trust Building*

Since multi-organizational initiatives do not function under a hierarchical logic, the role of the interorganizational governance structure is particularly important. A clear definition of roles and responsibilities helps to build trust by clarifying what each participating agency is responsible for and decreasing uncertainty about leadership, decision-making processes, and fairness among participating agencies. One WNV participant talked about his concerns and how they changed as roles and responsibilities were clarified.

I went forth to sell the unit's values and maintain its, or even increase, its equipment, personnel and funding--that was the initial thing. So I was not to lose any territory, not to see it taken... But then pretty quickly everything fell in line... Through the meetings with other organization[s] involved it was agreed that the animal virus lab's going to do this; the wildlife pathologist is going to do this, get the birds, identify the birds, get the tissues, order the tests that need to be put out there for the West Nile. We're all going to work together...

Similar interactions contributed to trust in the justice arena as well.

What we see with our systems and I'm sure with other Criminal Justice agency systems is a lot of duplication. We have this state-wide police information system here that uses data from other organizations and gee, because in the past we really didn't trust their capabilities [...] And what you can see with this new approach, this new model, is a very concerted effort to clearly define those domains. Well, what should DCJS be responsible for, what kind of functions and data? Likewise, what should State Police be responsible for? And when you build the next generation of systems, you need to eliminate all this duplication and you need to start building the trust level...

Through the structured process of social interaction in which the involved agencies exchanged and shared knowledge about the nature of the problem and their own organizations interests and capabilities the roles and responsibilities of each organization became better understood and agreed upon. Through this process of clarification, trust among the participating organizations increased and then directly affected the group's ability to integrate information for use in response efforts.

P1: A collaborative process of establishing clarity of role and responsibility builds trust across organizations involved in cross-boundary information sharing initiatives.

### *5.3 Respect for Autonomy of Participating Organizations and Trust Building*

Respecting the autonomy of participating organizations was adopted across the cases as a strategy to manage the diversity of goals and structures across participating organizations. Striking a balance between public health responsibilities and the public's right to know that satisfied both state and local public health and elected officials was critical to building trust.

The counties were concerned that if a West Nile bird showed up in their county, the other counties would see it and that maybe they could release [it] to the press... The press would be notified of a problem before the county commissioner was notified.

They needed time to react and marshal their resources ... So the rule we came up with--this was worked out through [name] and again, I'm not sure I agree with it but it worked and it still continues to be used--is that lab results would be delayed 24 hours for all the other counties to see, O.K.? And actually the county could at any moment make it visible but it would be delayed for 24 hours before the other counties would see it. The state could see it immediately; we could see it immediately cause we had to. But other counties couldn't see it immediately unless somebody there who had specific permission was to actually say, 'Yes, I'm going to make this available to them. O.K.?'

In each case the lead agency built trust by operating in a way that was respectful of the unique issues of each participating agency. Participatory decision-making was used regularly as a technique for balancing the need for individual agency autonomy and collective action.

There was a representative from each agency... And their job was basically to keep us on track. And there was negotiation because we would think that something was--we should be in charge of a certain piece of data. And then another agency says no, we're going to be in charge of that piece of data. And basically we would look at the business flow and determine then what the best approach would be based upon the business practice.

P2: Respect for the autonomy of each organization participating in a cross-boundary information sharing initiative enables joint focus on enterprise response capacity building.

#### *5.4 Exercise of Authority and Trust Building*

The cases highlight the impact of the exercise of authority on trust building. The state health commissioner in New York State tasked the public health enterprise within the state to respond to the WNV crisis. Justice professionals were also tasked – in Colorado by the legislature and in New York by the Director of Criminal Justice. In each case authority for the development of the specific response was distributed, but the approach was mandated – cooperative, cross-boundary efforts would be used.

New York was quickly able to respond to this mandate and launch an approach in which authority was distributed. State agency and local government leaders empowered animal and human public health experts in their respective fields to work collaboratively across traditional organizational boundaries to respond rapidly and effectively to a future re-emergence of the virus. The delegation of decision-making authority built trust among the experts to launch the response they collectively believed would work.

I think you really... can almost start with our commissioner... She pretty much said we're going to do this; we gotta get it done; we don't have much time and we're going to all cooperate. And I think it was understood by everyone that we were going to work together.

Colorado began its award winning effort to build response capacity through the implementation of informal bi-lateral transfers of information.

It really helped make this thing(.) the informal nature of it, the informal nature of decision-making really helped us make this thing happen at the beginning.

However, new legislation related to gun control raised the stakes and agencies began to question their willingness to be held accountable to these new requirements based on informal agreements. The trust that had been built up over the years through informal arrangements was being tested through the new requirements.

Well, it was forcing the creation of more bilateral transfers and we just didn't want to do any more of those. They were just getting to be too cumbersome and that's what forced the issue--let's do something different.

To sustain the agreements built previously on trust a new foundation of formal authority was required – but as the respondents from Colorado pointed out – it had to be just the right kind of authority.

The moment it gets some superior officer who can tell the five agencies what to do, the concept of inter-organizational cooperation is out the window. And they don't understand that. They think it can be legislated; they think it can be mandated. And they don't understand why we've been as successful as we've been so far has nothing to do with statute--we wrote the statute. It has nothing to do with making people do stuff 'cause nothing, I mean, they've made people do stuff for a long time and no one ever does it. It was getting the five agencies to play nice in the sandbox--that's what makes CICJIS effective.

The exercise of authority provided a foundation for a collaborative effort to be launched in one case and in another it formalized a long-standing trust-based approach to capacity building. In both cases, trust was built among the participants because they were authorized to act or in the case of Colorado to continue to act collaboratively to determine the best solution rather than directed to solve the problem with a specific pre-determined strategy.

P3: Mandating collaborative approaches to decision making for capacity building rather than specific strategies for implementation builds trust in participating response agencies.

## 6. Conclusions

This study offers valuable theoretical and practitioner insights into how trust develops in cross-boundary information sharing initiatives. In particular, the findings from this study suggest that the context within which an information integration initiative is taking place is a critical determinant of the role of trust in those interactions. Of note, while the two case studies discussed in this paper focus on U.S. government organizations, European government organizations also can also leverage these findings.

Clarity of roles and responsibilities, respect for autonomy and exercise of authority, as determinants of trust, are not necessarily independent and in fact work in a complex interplay. Respect for the autonomy of participating organizations created an environment where all involved worked collaboratively to clarify their own roles and responsibilities in the cross-boundary information sharing initiative. The authority exercised in each case enabled a collaborative approach to problem solving. Overall responsibility was shared, but individual task responsibility was carefully and consistently clarified and communicated. Participants were directed by their authority base to work collaboratively to develop a solution that made sense given the specific set of conditions. Solutions were not handed down from on high with a requirement that they be implemented – independent of relevance to the context. This approach continued to build support for collaborative efforts and trust in the actual support for jointly developed solutions. Response capacity was consistently improved through the increasing willingness of participants overtime to invest in cross-boundary information sharing efforts.

Some practical lessons can also be derived from this study. For instance, given the critical role trust plays in fostering collaboration and allowing the development of enterprise-wide integrated information resources, planning for new cross-boundary information sharing initiatives should explicitly include resources for trust building among information sharing partners as well as IT infrastructure.

The following propositions capture the relationships found through our extensive qualitative analysis and are intended to provide guidance for future research (see Table 1). They are empirically grounded in data and constitute a significant contribution to what is known about the determinants of trust building in cross-boundary information sharing initiatives.

*Table 1. Propositions on the Determinants of Trust in III*

P1: A collaborative process of establishing clarity of role and responsibility builds trust across organizations involved in cross-boundary information sharing initiatives.
P2: Respect for the autonomy of each organization participating in a cross-boundary information sharing initiative enables joint focus on enterprise response capacity building.
P3: Mandating collaborative approaches to decision making for capacity building rather than specific strategies for implementation builds trust in participating response agencies.

Future studies should test these propositions in different contexts. Such contexts could include the cross-boundary information sharing efforts of other policy areas outside of the public health and criminal justice; possibly in public education or social welfare. In addition, testing of these propositions within different policy areas and either confirming or identifying contradictions can contribute to a larger and more comprehensive theory about

the role of different determinants of trust building in cross-boundary information sharing initiatives within and outside of the public sector.

## References

- [1] Wastell, D.G., *Learning Dysfunctions in Information Systems Development: Overcoming the Social Defenses With Transitional Objects*. MIS Quarterly, 1999. **23**(4): p. 581-600.
- [2] Senge, P.M., *The Leader's New Work: Building Learning Organizations*. Sloan Management Review, 1990(Fall): p. 7-23.
- [3] Powell, W.K., K.W. Koput, and L. Smith-Doerr, *Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology*. Administrative Science Quarterly, 1996. **41**: p. 116-145.
- [4] Chua, A., *The influence of social interaction on knowledge creation*. Journal of Intellectual Capital, 2002. **3**(4): p. 375-392.
- [5] Cresswell, A.M., et al. *Trust and networking: Knowledge sharing in the public sector*. in *Academy of Management Conference*. 2002. Denver.
- [6] O'Toole, L.J. and K.J. Meier, *Modeling the Impact of Public Management: Implications of Structural Context*. Journal of Public Administration Research and Theory, 1999. **9**(4): p. 505-526.
- [7] Nahapiet, J. and S. Ghoshal, *Social Capital, Intellectual Capital, and the Organizational Advantage*. Academy of Management Review, 1998. **23**(2): p. 242-266.
- [8] Cunningham, I., *Developing human and social capital in organizations*. Industrial and Commercial Training, 2002. **34**(3): p. 89-94.
- [9] Cohen, D. and L. Prusak, *In Good Company: How Social Capital Makes Organizations Work*. 2001, Boston: Harvard Business School Press.
- [10] Zhang, J., Dawes, S. S., & Sarkis, J., *Exploring stakeholders' expectations of the benefits and barriers of e-government knowledge sharing*. Journal of Enterprise Information Systems, special issue on E-Government., in press.
- [11] Pardo, T.A., Cresswell, A. M., Dawes, S. S. & Burke, G. B. *Modeling the social & technical processes of interorganizational information integration*. in *37th Hawaiian International Conference on System Sciences*. 2004.
- [12] Zhang, J., Faerman, S.R., & Cresswell, A.M. *The effect of organizational/ technological factors and the nature of knowledge on knowledge sharing*. in *39th Hawaii International Conference on System Sciences (HICSS)*. 2006.
- [13] Krishnan, R., et al., *On Heterogeneous Database Retrieval: A Cognitively Guided Approach*. Information Systems Research, 2001. **12**(3): p. 286-301.
- [14] Hsu, C.-N. and C.A. Knoblock, *Semantic Query Optimization for Query Plans of Heterogeneous Multidatabase Systems*. IEEE Transactions on Knowledge and Data Engineering, 2000. **12**(6): p. 959-979.
- [15] Ambite, J.L. and C.A. Knoblock, *Agents for Information Gathering*. IEEE Expert Intelligence Systems & Their Applications, 1997. **12**(5): p. 2-5.
- [16] Zuboff, S., *In the age of the smart machine: The future of work and power*. 1984, New York.
- [17] Pardo, T.A., et al. *Interorganizational knowledge sharing in public sector innovations*. in *Annual Conference of the Academy of Management, Washington DC, and to be published in the Best Paper Proceedings*. 2001.
- [18] Fountain, J.E., *Building the virtual state: Information technology and institutional change*. 2001, Washington: The Brookings Institution.
- [19] Davenport, T.A., *Process Innovation: Reengineering Work Through Information Technology*. 1993, Boston, MA: Harvard Business School Press.
- [20] Dirks, K.T. and D.L. Ferrin, *The Role of Trust in Organizational Settings*. Organization Science, 2001. **12**(4): p. 450-467.
- [21] Pardo, T.A., Cresswell, A. M., Thompson, F., & Zhang, J., *Knowledge sharing in cross-boundary Information Systems Development*. Journal of Information Technology and Management, special issue on Information Sharing across Multiple Organizations, forthcoming.
- [22] Strauss, A. and J. Corbin, *Grounded Theory in Practice*. 1997, Thousand Oaks, CA: Sage Publications.
- [23] Strauss, A. and J. Corbin, *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*. 1998, Thousand Oaks, CA: Sage Publications.