

Resilience of Post-disaster Emergency Response Networks: Evacuation Response and
Texas School Districts

Scott E. Robinson*

The effect of goal
alignment
patterns on policy
outcomes for
state
administered
federal mandates.

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Abstract:

Studies of collaborative public management have relied on a number of concepts that are time-bound. Collaborative networks rely on trust and stable expectations – both elements that have strong temporal elements. Despite this attention, there has been less research into the evolution of collaborative relationships than one would expect – especially using large-N quantitative methodologies. This is due in part to the methodological difficulties of studying relationships across time using survey methodologies. This paper reports results from a survey of school districts immediately following Hurricane Katrina that asked about their collaborative relationships – including their intentions to sustain collaborative relationships. The results suggest that collaborative relationships involving sharing resources and more involved communication are more likely to serve the basis for continuing collaborations. The results also suggest the limitation of single-shot surveys as a method for investigating the evolution of collaborative relationships and justifications for moving to (admittedly more difficult) panel designs.

* Questions should be address to the author at srobinson@bushschool.tamu.edu.

I. Introduction

Collaboration has become a major topic of interest in the study of public management. The signal indication of this new found prominence has been a special issue of *Public Administration Review*, an associated conference, and a couple of prominent forthcoming volumes devoted to the subject. As the special issue of *Public Administration Review* makes clear, research has still only touched the surface of collaborative public management. A better understanding of collaborative public management will require further theoretical development related to such subjects as the meaning of collaboration (as distinguished from coordination) and the linkage between collaboration, participation, and conflict resolution process. There will also be a need for better instruments for measuring collaboration and careful collection of data about collaborative public management.

This paper addresses a subject that crosses the boundaries of the needs for theoretical and empirical development of our knowledge of collaborative public management. Some have pointed to the age of a relationship as a characteristic that distinguishes collaboration from other less intense relationships. True collaboration, they argue, involves the continued interaction of participants in a relationship in which trust and clear expectations become important guiding principles (Bingham and O'Leary 2006). An empirically driven assessment of network performance similarly identified the stability of a network across time as a potentially vital component of an effective network of social service providers (Provan and Milward 1995). All this suggests that time is an important aspect of collaboration, but theoretical attention to the role of time has been

limited. Similarly, empirical research into the evolution of collaborative relationships across time has been limited. There have been some notable case studies that have looked at the evolution of networks over time (for a review, see Robinson 2006). However, these case studies have not lead to large N quantitative assessment due in part to the difficulty of collecting comparable data on collaborations (Meier and O'Toole 2005). This problem is even more acute in the case of studying the temporal dimension of collaborative relationships. Studying the temporal dimensions of collaboration calls not only for a set of comparable units for study, but measurement across time. For this reason, the few surveys of collaborative public management that exist are predominantly cross-sectional (e.g. Meier and O'Toole 2001). This limitation has recently been overcome. Recent surveys have provided some measures of collaboration that allow for time-serial analysis (O'Toole et al. 2006).

This paper presents results from a recent survey of public management that provides some insight into the temporal dimension of collaboration. Specifically, the paper analyzes the factors most conducive to long lasting collaborations. The next section reviews the literature on collaborative public management with special attention to where the literature suggests that time is an important dimension in collaborations. The third section will review the data and methods used to assess the relative importance of various factors related to resilient collaborative relationships. The fourth section reviews the results of the analysis while the fifth section places these results in the context of the existing literature and suggests how the literature can benefit from further inclusion of time-based elements in the study of collaborative public management.

II. Collaborative Public Management

To some eyes the study of collaborative public management is nothing new. Scholars have long discussed inter-organizational relationships involved in policymaking. One of the most famous studies of implementation (Pressman and Wildavsky 1984) took as its theme the important effect that the number of parties involved in a policy had on the likelihood of successful implementation. This study established as conventional wisdom the proposition that increasing the number of parties involved in policy implementation increased the probability of policy failure.

Despite Pressman and Wildavsky's warning that increased participation brought dangerous complications, it became obvious that policy implementation commonly employed networks of actors rather than a simple hierarchy (O'Toole 1997, O'Toole and Hall 2000). Provan and Milward provided some of the hallmark studies describing common networks arrangements and arguing that the US was moving towards a "hollow state" (Milward and Provan 2000, 2004). Their studies stand today as some of the best accounts of how collaborative public management works in social service delivery.

The descriptive accounts of collaborative networks were followed by a series of quantitative studies of collaborative managerial behavior. The most prominent of these studies were the studies of Texas school districts (e.g. Meier and O'Toole 2001, 2005). In these studies, Meier and O'Toole found that school superintendents adopted a range of collaborative approaches to such external organizations as business groups, other school districts, and government officials. Reports of collaborative relationships scaled onto a single measure of increased collaborative management (Meier and O'Toole 2005). This

scale then became a singular measure of collaborative public management. Meier and O'Toole found that internal networking (collaborative relationships with subordinates at various campuses) was related to external networking (collaborative relationships with people outside of the district) and that external networking was related to district performance (Meier and O'Toole 2003).

Within this growing volume of studies, there was very little attention to changes in collaborative relationships across time. Provan and Milward's study of network effectiveness, itself an understudied area of collaborative public management, led them to speculate about the role of time in the effectiveness of networks (Provan and Milward 1995). They argued that stability across time was a potentially important component of network effectiveness. They observed that some of the poor performing networks had recently experienced disruption. These networks had not had the time to develop trust between network actors and stable expectations to guide coordinated behavior. As a result, they argued, it was more difficult for these networks to be effective. They hypothesized that as networks aged they would have the opportunity to be more effective.

Provan and Milward's suggestion that age and stability are keys to successful collaborative networks stands in direct contrast to the experiences of many in the area of disaster response. The research in to disaster response networks, often involving extensive collaboration across traditional sectors, has suggested that these networks emerge spontaneously following a disaster (Comfort 1993). In her research, the disaster recovery process was largely ad hoc. Actors not previously identified as being part of the network stepped up to provide assistance. Actors took on new and unexpected roles. These unplanned networks still proved to be effective in some circumstances. Evidence

in the wake Hurricane Katrina suggests that one should not take the spontaneous emergence argument too far (Robinson, Berrett, and Stone 2007). Pre-existing relationships between actors, often having little to do with disaster recovery, aided in the building of ad hoc disaster networks in the wake of Hurricane Katrina. The spontaneous nature of these networks (whether the networks are completely or even partially spontaneous) calls into question whether age plays the role in disaster response organizations than suggested by Provan and Milward.

The contrast between the experiences in social service networks and the experiences in disaster response and recovery networks raises an interesting question for scholars of collaboration. Time has an important role in the theory of collaborative. It is not clear though what factors contribute to the longevity of these collaborative relationships. There is little theory to serve as a guide in this process. This paper takes a preliminary step towards developing a theory of collaborative resilience by testing an inductive model. The next section describes our strategy for measuring collaboration, collaborative resilience, and several potential independent variables.

III. Measurement and Methods

This section describes a quantitative method for identifying factors related to the resilience of collaborative relationships. It first describes the survey the results of which are presented here. Second, it describes a variety of approaches for measuring the resilience of collaborative relationships. It then describes the sorts of independent

variables that one could be related to resilience. It concludes with a discussion of how different data could eliminate potential sources of error in the measurement approach.

The findings reported here are from a survey of Texas public school districts following Hurricane Katrina. Soon after Hurricane Katrina (and Hurricane Rita) we sent a survey to each public school district superintendent in the state of Texas. This survey followed the methods employed in several previous surveys of this population (Meier and O'Toole 2005). Following three waves of the survey, approximately 60% of the school districts had responded. The responding districts come disproportionately from larger districts that were more likely to be affected by the hurricanes or people displaced by the hurricanes – though these differences between the size of respondent and non-respondents were small. The survey asked a battery of questions about the experiences of the district after the hurricane including whether they provided services for students displaced by the hurricane, were directly affected, or were unaffected by the hurricanes. Additionally, the survey asked about the district's experiences with collaboration related to disaster preparedness and response. It is from this battery of questions that I draw the variables for the analyses reported here.

Measuring collaborative relationships across time puts special demands on data sets. There are a variety of approaches to tackle these demands. The simplest method is to ask respondents with whom the respondent is collaborating and how long these collaborations have existed. This involves retrospective, subjective evaluation. The respondent defines for him or herself what constitutes collaboration and recalls how long this collaboration has existed. This approach is potentially problematic because of both its subjective and retrospective elements. The self-definition of collaboration is

problematic because there is no consensus on the definition. As such, each respondent may be applying considerations in their judgment as to whether a relationship counts as collaboration. In that the public administration research community has yet to reach a consensus on what counts as collaboration, it is quite likely that different respondents have different standards for collaboration.¹

There are additional problems related to the retrospective evaluation of collaborations. Retrospective evaluations involve a series of potential biases related to the limitations of survey respondents' abilities to recall past behavior (Torengau et al. 2000). For example, respondents are likely to overestimate the frequency of events if they have occurred more recently. This limits the reliability of responses based on recall and suggests that there may be a strong correlation between contemporary events and recalled behavior (independent of any relationship between the cotemporary events and actual behavior in the past).

The combination of the potentially broad self-definition of collaboration and the potential biases in recalled behavior lead me to question the value of the data resulting from this question strategy. We asked each respondent to assess how long they have worked with each of six types of collaborative partners. Respondents were asked to report the age of the relationship ranging from "since Katrina/Rita" to "more than five years." The results of these questions are reported in Table 1. Overwhelming, districts reported having long standing relationships with all potential actors. With so many districts reporting long-standing relationships, there is little variation with which to study the durability of these relationships (since they all seem to survive).

¹ For a fuller discussion of these measurement problems, see Robinson and Gaddis (2007).

A second strategy, and the one employed in this study, is to instead measure resilience prospectively. Instead of asking respondents to recall behavior, one can ask them to predict their own behavior. This approach involves its own set of biases. Respondents have to guess whether they will continue collaborative relationships. This may be a necessary precondition to the continuation of the relationship (it is unlikely that a respondent will be surprised to find that she continues to collaborate with someone) but it is a minimal requirement for actual resilience.² Actual resilience would require the combination of intention and action. Table 2 reports the results related to a question about with whom the respondents anticipate continuing to collaborate. Interestingly, respondents were less likely to say that they intend to continue collaboration related to disaster preparedness with a party than to report that they recall a long standing collaboration (here defined as greater than 1 year old). For this study, I employ the prospective evaluation of resilience to eliminate the retrospective bias and to tap into the necessary condition dimension of the intention to collaborate in the future.

An alternative approach to the measurement of resilience of collaboration would be to set up an actual panel of surveys. This approach would still involve a subjective dimension if based on simple questions related to respondent defined collaboration. However, asking the question over time would limit the influence of the retrospective recall bias while avoiding the problems of prospective evaluation. Such a design would involve only the short term reporting of behavior that is more reliable than distant recalled behavior, but is resource intensive design. A panel of survey requires repeated

² For a similar argument about a necessary condition measure of collaboration, see Meier and O'Toole 2005.

administrations of the survey to the same population. In the future, researchers should strongly consider this option if such data are available.

To explain the intentional aspect of collaborative resilience, one could look at the influence of managerial style, organizational structure, or policy situation. For this study, I limit myself to characteristics of post-disaster collaborative activities. I employ a series of questions about the nature of the collaborations between organizations including the nature of the resources shared and the nature of the communication between collaborative partners. In terms of the nature of the resources shared, I include whether the collaboration involved the sharing of personnel and/or the sharing of information. In terms of the nature of communication between collaborative partners, I include whether the respondents reported meeting in-person, contacting partners over the phone, and/or whether the relationship involves regularly scheduled meetings. In the interest of keeping this preliminary study as simple as possible, I limit my attention to this class of variables. I leave the assessment of the impact of style, structure, and situation to future studies.

Table 3 reports the analysis of the intent to continue collaborating with government relief and welfare organizations. The results are not wholly surprising. Organizations that had more intensive contacts with collaborators were more likely to report an intention to continue their collaborative relationships with government organizations. As one would expect, collaborations that involved shared resources are more likely to be related to respondents' reports of intentions to sustain collaboration. More interesting is that the different types of shared resources have predictably different effects. Sharing information is less of an influence on sustaining relationships than

sharing personnel. Sharing personnel involves a greater opportunity cost for the organizations. It is interesting that these greater investments (despite being sunk costs) influence intentions to sustain collaborations. The nature of the contact between collaborative partners is also important. Having meetings in-person and/or over the phone positively affect the likelihood that respondents intend to sustain the collaboration. Reporting having had regular meetings, predictably, has the greatest effect. This represents an element of formalization in the collaborative relationship. Having invested in setting up regular meetings, respondents were much more likely to report an intention to sustain these relationships. It may be that the intention to sustain the relationship is built into respondents' identification of the regularity of meetings. The overall fit of the model is impressive for such a sparse set of predictor variables. Pseudo R^2 values tend to run lower than R^2 values for linear regressions. Even using this conservative measure of fit, the sparse variables explain over a quarter of the total variation – without including style, structure, or situational controls. Overall, the results for the nature of contact reinforce the conclusion that investments of opportunity costs (e.g. commitments to regular meetings) increase respondent's commitment to sustaining relationships with government organizations.

Table 4 reports the same model using data for reported collaborations with nonprofit organizations. The finds are consistent across the board. The magnitudes of the effects drop and the overall predictive power of the equation drops. These collaborative relationships are less fully predicted by the nature of contact or resources shared. The Pseudo R^2 value drops by almost a third. Predicting collaborations with

these variables is less successful for nonprofit – though the direction and relative magnitude of the predictor variables remain the same.

IV. Conclusions

The results for this preliminary study are not entirely surprising. Organizations that invest a greater amount of time and other resources to a relationship are more likely to intend to sustain the relationship. The relative magnitudes of the coefficients reinforce the opportunity cost explanation. The collaborative activities that involve the least investment are the least powerfully associated with an intention to sustain the relationship. This would include phone contacts and sharing information (except in the case of nonprofits where information sharing is more influential – possibly due to the extreme rarity of personnel trading in these collaborations). The higher cost activities have a larger impact, including such activities as regular meetings and personnel sharing.

The results reported here are preliminary. The few included variables are significant and explain a surprising percentage of the variation in the intent to sustain collaborations, but the models do not include a robust set of controls. As mentioned earlier, a full study would need to include controls for managerial style, organizational structure, and policy situation. Previous studies have established a reliable series of control variables for predicting school district effectiveness (Meier and O'Toole 2006). It is not entirely clear which of these control variables are appropriate for predicting collaborative behaviors. The literatures on organizational structure and managerial style are far less robust and provide less guidance. Research will likely have to remain

inductive in the absence of strong theory on which one can base justifications for selecting (and excluding) variables from the model.

The measurement of the dependent variable is also an area where more work is needed. Survey data of collaborative behaviors have generally been limited to single shot measurement – like that reported here. In this case, measurement has to involve retrospective or prospective evaluations. It would be preferable to employ a panel design in which organizations are asked about their collaborations in a series of surveys over time. This would limit the bias to that related to question wording ambiguity over the nature of collaboration without the retrospective and prospective biases.

My next step is to incorporate both of these elements using a soon to be available panel study of disaster collaboration. The survey used for this report was repeated in the Fall of 2006 through the Spring of 2007. This follow up survey includes the elements necessary to create a panel measure of resilience. We can check whether organizations that reported that they collaborated with various actors immediately following Hurricane Katrina also reported collaborating with those organizations a year later. Integrating these data with pre-existing data on style, structure, and situation will also allow us to test whether these factors affect resilience. The fully integrated study will likely produce more informative results.

Table 1. Reported Age of Collaborative Relationships

	Since Katrina	<1yr	1-5yrs	5+yrs
Police, Fire, and First Responders	8.5%	7.0%	18.1%	66.3%
Nonprofit/Relief Organizations	20.6%	8.1%	17.4%	53.9%
Other School Districts	7.9%	6.3%	16.1%	69.7%
Government Relief/Welfare	19.4%	12.8%	15.1%	52.6%
Business Organizations	11.0%	6.2%	16.5%	66.3%
Local/Community/Religious	9.1%	5.6%	14.7%	70.6%

Table 2. Respondents Reporting Intent to Continue Collaboration

With which of these groups do you intend on sustaining regular contact with for the purposes of emergency preparation?

90.4%	Police, Fire, and First Responders
49.4%	Nonprofit/Relief Organizations (i.e. Red Cross)
64.8%	Other School Districts
41.9%	Government Relief/Welfare Organizations
31.7%	Business Organizations
69.2%	Local/Community/Religious Organizations

Table 3. Factors Influencing the Likelihood of a Sustained Collaboration with Government Relief and Welfare Organizations

Independent Variable	Coefficient	Z-score
Personnel Sharing	2.02	3.87
Information Sharing	1.62	6.30
In-Person Meetings	.731	2.55
Phone Contact	.306	1.30
Regular Meetings	2.04	4.10

N: 538

Pseudo R2: .27

LR test: 195.96 (p<.0001)

Table 4. Factors Influencing the Likelihood of a Sustained Collaboration with Nonprofit Relief Organizations

Independent Variable	Coefficient	Z-score
Personnel Sharing	.841	2.15
Information Sharing	1.29	5.65
In-Person Meetings	.870	3.29
Phone Contact	.549	2.44
Regular Meetings	1.08	3.21

N: 538

Pseudo R2: .20

LR test: 148.99 (p<.0001)

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