Networking and Crisis Management Capacity: A Nested Analysis of Local-Level Collaboration in Sweden

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Abstract

Studies of how actors collaborate across organizational boundaries to prepare for and respond to extreme events have traditionally focused on describing network structure whereas fewer studies empirically investigate how network relationships influence crisis management capacities. Using survey data on crisis management work in Swedish municipalities, this study considers how the number of collaboration partners and venues for collaboration (networking) influence organizational goal attainment. Given managerial costs associated with increasingly complex collaboration networks, the study explores the diminishing returns hypothesis, which predicts a positive relationship between networking and goal attainment up to a certain point when payoffs do not increase. Results support a nonlinear relationship; networking at low levels had a positive effect on goal attainment whereas no relationship was found at moderate or high levels. To identify characteristics of collaboration conducive to performance, the study undertakes a comparative case study of two low-residual cases where the relationship between networking and performance follow the predicted nonlinear curve and one deviant case where high levels of networking had a positive effect on performance. The cases show that stable interpersonal relationships, clarification of the terms of collaboration, shared problem perceptions, and coordination of joint decision making constitute important assembly mechanisms for overcoming collective action problems.

Keywords

networking, collaboration, performance, goal attainment, crisis management, Sweden

Introduction

Research on how societies adapt to crisis and risk has grown substantially in the past decades and turned the spotlight on the relationship between collaborative boundary work and crisis management. This research departs from the insight that risks, hazards, and crises involve complex challenges that no organization can handle alone, which calls for multi-organizational collaboration in risk assessment, planning, response, and recovery from extreme events (Hicklin, O'Toole, Meier, & Robinson, 2009; Kapucu, Arslan, & Collins, 2010; Waugh & Streib, 2006). Despite this insight, relatively few studies seek to explain why collaboration produces different outcomes for organizations (McGuire, Brudney, & Gazley, 2010), which is a broader focus in the public administration literature but an understudied topic in crisis management research (Provan, Fish, & Sydow, 2007). In response, this study empirically examines the relationship between networking and organizational crisis management capacity. The study uses survey data involving local-level managers in Sweden.

Collaboration has long been a key focus in crisis management research. Recently, this field has taken major leaps

forward following application of theoretical and methodological insights from the broader literature on collaborative public management (e.g., McGuire, 2006; Waugh & Streib, 2006). These contributions demonstrate that crisis management is an increasingly professionalized domain, placing managers in the role as facilitators, brokers, and controllers of various formal and informal joint efforts to enhance crisis management capacity (McGuire, 2009; McGuire et al., 2010). This insight has spurred important work on several aspects of collaborative crisis management, but many studies conclude that more empirical research is needed to document the link between collaboration and crisis management capacity.

Crisis management involves temporal (mitigation, preparedness, response, and recovery) and spatial (ecological, social, economic, institutional, and infrastructural) dimensions. However, much prior empirical work focuses on how

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collaboration might promote crisis response capacity, placing the spotlight on collective actions to “bounce back” and return to a state of normalcy after extreme events (Kapucu, 2006; Kiefer & Montjoy, 2006; Robinson, Berrett, & Stone, 2006; Simo & Bies, 2007). Although some studies examine the effects of collaboration on planning and preparedness (e.g., Choi & Brower, 2006; Hossain & Kuti, 2010; McGuire & Silvia, 2010), none of these examine how collaboration enables or constrains organizations to reach policy goals associated with crisis management capacity.

To be clear, there is little consensus about standards for assessing crisis management capacity, which is one of those “wicked problems” where stakeholders have different understandings (cf. Weber & Khademan, 2008). Yet, one common benchmark utilized by researchers is to examine whether organizations meet policy goals that guide crisis planning, preparedness, and response (McConnell, 2011). Following this practice, the study examines how networking influences organizational goal attainment, using an aggregated measure of crisis response and risk reduction capacities as subjectively reported by local-level managers. Meanwhile, organizational goal attainment merely constitutes one way of measuring the impact of networking in the context of crisis management, which could also be assessed using various network-level measures (cf. Provan & Kenis, 2008).

There is agreement that organizations’ crisis management capacity depends on preestablished interorganizational relationships supporting trust, awareness of interdependency, and conflict resolution (Kapucu, 2008). Public organizations also invest significant time and resources in managing various collaborative arrangements for crisis management, which confirms that networking is a practical priority. However, orchestrating viable interorganizational networks is no easy task, especially in the pursuit of complex goals. Given costs associated with interorganizational networking (e.g., Agranoff & McGuire, 2011; O’Leary & Vij, 2012), the study examines the assumption that the relationship between networking and organizational performance is characterized by diminishing returns (Hicklin, O’Toole, & Meier, 2008; Meier & O’Toole, 2003; O’Toole & Meier, 2011; Schalk, 2015). Accordingly, due to limited resources and opportunity costs, engagement in collaboration networks can be expected to have a positive effect on organizational performance up to a certain tipping point where there is less or nothing more to gain from additional collaboration.

The study undertakes a nested analysis (Lieberman, 2005), combining a systematic analysis of all municipalities in Sweden ($n = 290$) with a comparative case analysis of three strategically selected municipality organizations. Multivariate regression analysis is applied to assess the explanatory power of the theoretical model, including causal effects and significance of independent variables influencing organizational performance. The case comparison identifies specific actions and developments influencing collaboration.

Networks and Performance

Scholars have begun to examine how collaboration networks influence performance at different levels as they become more complex in terms of the number of partners and activities (Ansell & Gash, 2008; Emerson, Nabatchi, & Balogh, 2011; Rogers & Weber, 2010). These studies have identified positive as well as negative effects. Broad stakeholder involvement in collaboration networks is likely to ensure access to additional and more diverse information and resources, and may also be a way to build support and commitment to joint policy goals (Schalk, 2015). At the same time, as the number of interactions grows, the risk increases that institutional barriers and cognitive differences will block joint action, which in turn will reduce the benefits of collaboration. Resources and managerial skills are therefore required to maintain collective capacities and avoid deadlocks (Van Bueren, Klijn, & Koppenjan, 2003). Furthermore, even if bigger networks have more resources at their disposal, they generally face difficulties to build trust and sanction defection, which can hamper network performance and limit payoffs for individual organizations (Poteete & Ostrom, 2004). Collaboration networks may thus reach a turning point in their development where further expansion of participants and increased frequency of interaction may lead to diminishing returns for networks and individual organizations.

This insight is the foundation of Meier and O’Toole’s (2003) public management model, which is a basis for assessing impacts of networking on organizations. The model defines networking as the level of interaction with external actors outside managers’ own organization.¹ First, the model assumes that administrative systems are autoregressive; that is, they tend to reproduce the same outputs over time. Second, the model is nonlinear rather than additive, suggesting that the relationship between networking (contact frequency) and performance is characterized by diminishing returns. Third, main drivers of performance involve networks, managerial networking, and the environment. The model assumes that higher levels of networking bring opportunity costs; networking with external actors may constrain investments in internal management, which at some point hampers organizational performance. The consequence may be that more networking leads to few positive performance payoffs (Hicklin et al., 2008). In addition, the model also assumes that the relationship between networking and organizational performance is affected by environmental factors, including task difficulty and resources, which need to be controlled for. In summary, the model hypothesizes the following:

Hypothesis 1: The relationship between networking and performance is nonlinear, with diminishing returns at the higher levels.

To test the diminishing returns hypothesis, this analysis compares three models—one linear base model, one nonlinear model, and one model controlling for time lag effects. The linear model (Equation 1) assumes that:

$$O_t = \beta_1 O_{t-1} + \beta_2 X_t + \beta_3 M_2 + \varepsilon_t \quad (1)$$

where O is a measure of an outcome, X is a vector of environmental forces (resources and constraints), M_2 includes efforts to manage externally (networking outside the own organization), β_{1-3} are estimable parameters, and ε is an error term. The model also includes an autoregressive component—the impact of past performance (O_{t-1}). In the next model (Equation 2), a squared value of networking (β_4) is added to the equation to incorporate the element of diminishing returns:

$$O_t = \beta_1 O_{t-1} + \beta_2 X_t + \beta_3 M_2 + \beta_4 (M_2)^2 + \varepsilon_t \quad (2)$$

If the assumption of diminishing returns is correct, the expectation following the addition of the squared network term is that the slope for the linear term (β_3) will be positive whereas the squared term (β_4) will be negative (Hicklin et al., 2008; Schalk, 2015).

The model also assumes that performance is moderated by a “quality” or skill component. Given evidence suggesting that managers vary considerably in quality and that skilled managers might be able to avoid any negative returns associated with higher levels of networking, the model assumes that managerial qualities might mitigate diminishing returns (Hicklin et al., 2008; Meier & O’Toole, 2003). Thus, it is hypothesized as follows:

Hypothesis 2: The relationship between networking and performance will be positive and linear when controlling for managerial quality.

Finally, although the model is based on the assumption that bureaucratic organizations change slowly (being autoregressive), previous empirical applications only account for lagged effects from the past experience variable (Meier & O’Toole, 2003). Others have suggested that this assumption could be expanded to account also for temporal changes in networking and environmental factors (Schalk, 2015). For example, effects of networking on organizational performance are likely to be mediated by trust, which takes time to develop (e.g., McGuire, 2006). Also, it generally takes some time to draw lessons from past events and to translate those lessons into change (Nohrstedt & Bodin, 2014). In turn, it is hypothesized as follows:

Hypothesis 3: The relationship between networking and performance is nonlinear, with diminishing returns at the higher levels when controlling for time lag effects.

Case Study Setting: Crisis Management in Swedish Municipalities

Sweden is a country where hazard-induced risks and losses remain relatively low, yet exposure to major crises and other security challenges has brought a distinct focus on crisis management. Expected costs associated with future hazards, particularly challenges connected to climate change, have also played a role in building broad political support and commitment to crisis management. In the Swedish crisis management system, municipalities are formally responsible for coordinating risk reduction, crisis planning, and preparation among authorities and stakeholders at the local level. As the municipalities have high degree of autonomy, they have considerable freedom to devise structures, processes, and practices for collaboration that are fitted to local needs and conditions.

Several recent reforms have been made to the Swedish crisis management system, many of which have sought to strengthen collaboration across sector and jurisdictional boundaries and levels of authority. One guiding idea has been that interorganizational collaboration is the main instrument to build common capacity for effective action in response to risks and threats (Lindberg & Sundelius, 2013). But, to date, there has been little reflection and discussion among academics and policy makers about the potential challenges and downsides associated with increasingly complex patterns of collaboration in this domain.

Data and Measurement

Data for this study were collected from national annual surveys administrated by the Swedish Civil Contingencies Agency targeting public managers in Swedish municipalities ($n = 290$). Respondents include local-government civil servants with responsibilities for contingency planning.² The survey addressed a range of issues related to civil emergency planning and response management, including organization, planning, risk and vulnerability analysis, collaboration, emergency experience, training, and education. This study includes survey responses from 3 years (2009–2011). Because the data are pooled, two initial diagnostics were conducted to deal with potential problems of serial correlation and heteroscedasticity (Hicklin et al., 2008). First, dummy variables were included for individual years to deal with serial correlation. Results indicated no significant relationship between these dummy variables and goal attainment.³ Second, each cross section was examined for heteroscedasticity, and the results showed that the levels were within acceptable levels.

Using survey data to document performance increases the risk of common source bias, which may generate false positives and negatives (Meier & O’Toole, 2013). Favero and Bullock (2015), therefore, argue that the only reliable solution is to rely on an independent source of data. However,

results from other studies suggest that the use of perceptual data on both sides of the equation does not result in overestimates of the impact of management on performance (Walker & Andrews, 2015). Although a common source design does not generate spurious results by default, the risk of common source bias should be kept in mind when interpreting the results of this study.

Outcomes

In this study, performance is understood as organizational goal attainment related to the implementation of performance targets for crisis management. Policies in any given area have multiple goals and are subject to multiple performance measures, some of which are defined by the political environment as being more important than others (Hicklin et al., 2008). In the context of crisis management in Sweden, the Government and the Association of Swedish Municipalities agreed in 2006 on four main performance targets, including capacity to respond to extreme events, knowledge about risks and vulnerabilities, planning for risk and vulnerability reduction, and capacity to achieve a common understanding of risks and vulnerabilities and promote coordination. These targets have guided performance measurement based on a 3-point scale (2 = *fully achieved*, 1 = *partly achieved*, 0 = *not achieved*). Factor analysis of these four items supported creation of a “goal attainment scale” ranging from 0 to 2 (higher scores indicating better goal attainment and thus higher performance).⁴ Hence, the dependent variable is an aggregated measure of crisis management capacity, which combines self-reported capacities to plan for and respond to extreme events. Conceptually, the study thus measures effects of network structure on goal attainment at the organizational level. Yet, fixating the level of the outcome is also complicated because the performance targets cover tasks related to crisis management that typically require interorganizational collaboration and could therefore be depicted as instances of coordinated collective action (network-level outcome). However, because performance is measured using survey responses by municipality managers—as opposed to multiple respondents from different organizations—the aggregated measure is defined here at the organizational level.

Networking

Following the O’Toole and Meier model, *networking* refers to external interactions with actors outside respondents’ own organization (in this case municipalities) (Hicklin et al., 2008; Meier & O’Toole, 2003). Networking is commonly measured by the level or intensity of interactions among actors, often by self-reported ordinal survey data capturing contact frequency (Robinson & Gaddis, 2012).⁵ Such data are, however, subject to potential bias due to different interpretations of survey questions and social desirability issues (Zhu, Robinson, & Torenvlied, 2014). To measure the level

of networking, this study combines the number of reported contacts with other organizations and the number of collaboration venues utilized by each municipality to enable and support such contacts. Networking is thus understood as a function of (a) the sum of collaboration relationships with representatives of other organizations and (b) opportunities for interorganizational collaboration. Together, these two measures provide data of the size of collaborative networks over time. Although this operationalization might reduce the risk of bias associated with interaction frequency (it is likely easier for respondents to recall collaborators than estimating the frequency of contact with each one of them), it does not include information about networking activities. In this study, nine predefined sets of actors included in the survey were selected—police, county administrative boards, county councils, other municipalities, business, military, religious organizations, voluntary groups, and other organizations (open category).⁶ Four venues that provide opportunity for interorganizational interaction were included: local crisis management councils, regional crisis management councils, intermunicipality councils, and other venues (open category). A “networking scale” was created by multiplying the number of reported contacts with the number of venues with final scores in the range 0 to 36 (higher scores indicating more networking). Inspection of Q-Q plots and histograms confirmed that the networking variable was normally distributed.

Environmental Factors

According to the O’Toole–Meier model, the relationship between networking and performance can be moderated by a set of environmental factors (the X variable in the model), which include both opportunities (resources) and constraints (task difficulty). This analysis focuses exclusively on the financial resources available to the network. Whereas other types of resources (e.g., experience, knowledge, information, time) are indeed relevant, financial resources can be seen as a means to access other resources (Rethemeyer & Hatmaker, 2007). Two separate measures are included: amount of resources granted to municipalities by central government (central resources) and the share of full-time position devoted to coordinate implementation of crisis management responsibilities (coordination resources).⁷ Both these types of resources can be expected to have a positive effect on organizational goal attainment. Managers are also constrained by a wide range of factors that they cannot control. Risks, hazards, and crises are often depicted “wicked problems” characterized by unclear attributes and multiple candidate solutions (e.g., Weber & Khademian, 2008). Although these characteristics increase the level of task difficulty compared with many other problems, one would also expect some variability across municipalities. Three measures are used to estimate these differences: number of crisis events, natural hazard experience, and risk analysis. Number of crisis events

refers to the number of contingencies each year that have called for some coordinated crisis response within the municipality. Natural hazard experience is included to assess if there is a difference between different types of events (man-made vs. natural hazards). The final measure—risk analysis—is an additive scale of the number of areas of public service for which risk analyses have been conducted. The survey identified 11 such areas.

Managerial Quality

The specific combination of managerial skills that is conducive to performance is likely to vary across networks and is based on a combination of interpersonal skills and network assembly mechanisms (Guimerá, Uzzi, Spiro, & Amaral, 2005; O'Leary, Choi, & Gerard, 2012). In the context of crisis management, findings by McGuire (2009) suggest that managers with higher levels of education and training engage more in collaborative activities than managers with less education and training. Therefore, this study includes two controls measuring the level of education and training as proxies for managerial quality. These measures combine (a) education of municipality executive boards and staff and (b) training involving different municipality functions. Both measures are additive and range from 0 to 1.

Analysis and Results

Data Analysis

Results from all regression models are presented in Table 1. Results for the base linear model (Equation 1) show, first, that the standardized slope coefficients of past performance ($\beta = .34, p < .01$) and network management ($\beta = .29, p < .01$) are positive and significant. Network management and past performance thus seem to matter in explaining goal attainment. Given the expectation that bureaucratic organizations reproduce outcomes over time, the relatively weak effect of the past performance variable is noteworthy; although the positive coefficient indicates some inertia in goal attainment, the relatively large distance of the coefficient from 1.0 indicates substantial variability in goal attainment over time. Some of this variance might be explained by the fact that performance scores are based on an additive measure of four separate goals, and it is likely that the value on at least one of these goals has changed from 1 year to another.⁸

Second, among the environmental variables, only central resources and risk analysis have significant effects on goal attainment. Contrary to the expectation, the effect is negative for central resources ($\beta = -.09, p < .05$), which would suggest that municipalities with more central resources are slightly less successful in reaching performance targets compared with municipalities that are granted more resources. The effect from risk analysis is positive ($\beta = .12, p < .01$), which indicates that risk analyses covering a greater number

of areas are positively associated with goal attainment. Coordination resources, number of events, and natural hazard experience did not have any significant effects on goal attainment. In summary, these results from the base linear model confirm the theoretical expectations regarding the autoregressive nature of performance and the role of networking in goal attainment.

Turning to the nonlinear estimation (Equation 2), the results show that the slope for the linear networking term remains positive and significant ($\beta = .57, p < .01$), whereas the slope for the squared networking term is significant but negative ($\beta = -.29, p < .05$). This observation is thus consistent with a pattern of diminishing returns (Hypothesis 1). Figure 1 displays patterns for the linear model and the nonlinear model, respectively.

The nonlinear effect can be assessed in more detail by partitioning the sample using a different type of subset (Hicklin et al., 2008; O'Toole & Meier, 2011). Partitioning of the sample is a superior strategy to using interaction terms to estimate nonlinear elements because interaction terms are usually plagued by collinearity problems (Meier & O'Toole, 2003). Columns 4 to 7 in Table 1 split the municipalities into four quartiles according to different levels of networking. The results for these analyses are overall consistent with the nonlinear model; they suggest that past performance and networking have a positive effect on goal attainment, whereas the other variables are unimportant (except for isolated effects from risk analysis in Quartile 1 and central resources in Quartile 4). Slope values for networking and the level of fit for each model provide evidence that networking has a significant and positive effect on performance in the first ($\beta = .32, p < .01$), third ($\beta = .15, p < .05$), and the fourth quartiles ($\beta = .21, p < .05$). Note here that quartiles 2 and 3 have lower confidence levels and that the coefficient in the second quartile is not significant, suggesting no impact of networking on performance for municipalities in this quartile. Quartile 1 has the best fit where the combination of variables account for 37% of the variance whereas Quartile 4 has the lowest level of fit (9%). In aggregate, these results provide additional empirical confirmation of a nonlinear relationship between networking and performance in this case.

The effect of past performance remains significant and positive across all four quartiles, which confirms that past performance affects goal attainment across the whole sample. However, the effect increases from the first ($\beta = .30, p < .01$) to the third quartile ($\beta = .42, p < .01$), but then it decreases again in the fourth quartile ($\beta = .21, p < .05$). One possible interpretation of this pattern is that more networked organizations have more flexibility to change over time (Meier & O'Toole, 2003). Meanwhile, the reduced effect between the third and the fourth quartile suggests that networking might also reach a point when the complexity of interaction constrains the ability to change (cf. Kraatz, 1998).

Next, the analysis tests Hypothesis 2, which predicts that municipalities with high managerial quality (measured by

Table 1. Multivariate Regression Analysis of Municipality Performance.

	Networking models		Models of performance at different levels of networking (4 = maximum) ^a				Networking quality models	
	Base linear model	Nonlinear model	Quartile 1 model	Quartile 2 model	Quartile 3 model	Quartile 4 model	Base linear networking quality model	Nonlinear networking quality model
Past performance	.346 ^{***} (.034)	.344 ^{***} (.034)	.306 ^{***} (.082)	.363 ^{***} (.079)	.424 ^{***} (.058)	.212 ^{**} (.064)	.346 ^{***} (.035)	.345 ^{***} (.035)
Networking	.291 ^{***} (.002)	.577 ^{***} (.007)	.321 ^{***} (.026)	-.090 (.043)	.152 ^{**} (.013)	.216 ^{**} (.005)	.291 ^{***} (.002)	.578 ^{***} (.007)
Networking squared		-.296 ^{***} (.000)						-.296 ^{***} (.000)
Coordination resources	.039 (.031)	.035 (.031)	.158 [*] (.117)	.042 (.096)	-.036 (.062)	-.010 (.040)	.039 (.031)	.035 (.031)
Central resources	-.091 ^{**} (.000)	-.093 ^{***} (.000)	.054 (.000)	-.036 (.000)	.105 (.000)	-.197 ^{***} (.000)	-.091 ^{**} (.000)	-.093 ^{***} (.000)
Number of events	.034 (.012)	.028 (.012)	-.015 (.035)	.207 (.039)	-.079 (.021)	.093 (.016)	.034 (.012)	.029 (.012)
Natural hazard experience	-.107 [*] (.075)	-.097 (.075)	-.127 (.218)	-.198 (.202)	-.019 (.130)	-.129 (.109)	-.107 [*] (.075)	-.097 (.075)
Risk analysis	.122 ^{***} (.005)	.117 ^{***} (.005)	.205 ^{***} (.011)	.072 (.011)	.058 (.008)	.054 (.008)	.121 ^{***} (.005)	.115 ^{***} (.005)
Education							.014 (.047)	.013 (.047)
Training							-.009 (.054)	.012 (.054)
Constant	.688 ^{***} (.054)	.605 ^{***} (.066)	-.079 (.173)	1.253 ^{***} (.361)	.484 ^{***} (.207)	1.056 ^{***} (.158)	.683 ^{***} (.059)	.601 ^{***} (.069)
Adjusted R ²	.26	.27	.38	.11	.22	.09	.26	.26
SE	.348	.347	.366	.342	.329	.314	.349	.347
F	25.435	23.327	9.717	2.716	7.024	2.815	20.292	19.033
n (municipality years)	557 ^b	557 ^b	121	112	174	150	557 ^b	557 ^b

Note. Dependent variable: goal attainment scale. Standard errors in parentheses. Dummy variables for individual years not reported.

^aRange for networking score in Quartile 1 = 0-6, Quartile 2 = 7-9, Quartile 3 = 10-16, Quartile 4 = 17-36.

^bLack of data on past performance from 2008 in combination with missing values for 23 cases explains why the number of observations is 557.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Figure 1. Linear versus nonlinear relationship between networking scores and goal attainment scale in Swedish municipalities 2010-2011 based on bivariate linear regression analysis.

Note. Dependent variable: goal attainment scale, independent variable: networking scale. $\beta = .335, p < .01$, adjusted $R^2 = .11$.

the level of education and training) are able to mitigate diminishing returns. If this hypothesis is correct, we would expect to find a positive and linear relationship between networking and performance when controlling for managerial quality. Columns 8 and 9 in Table 1 summarize the results for this test. Contrary to Hypothesis 2 and findings reported elsewhere (Hicklin et al., 2008; Meier & O'Toole, 2003), the results indicate that the nonlinear effect from networking is not mitigated by managerial quality. The squared networking term remains negative and significant ($\beta = -.29, p < .01$), and the size of the networking coefficient ($\beta = .57, p < .01$) does not change compared with the nonlinear linear model excluding networking quality variables (Column 3; $\beta = .57, p < .01$). The level of fit also remains the same for these two models. Hence, in this case, education and training do not provide sufficient managerial qualities to mitigate diminishing returns from networking. This finding, however, is based on education and training as proxies for networking quality, which are relatively rough measures that do not capture the full range of skills needed to cope with challenges encountered at higher levels of networking (cf. McGuire, 2006; O'Leary, Choi & Gerard, 2012). The comparative case study compensates for these limitations by enabling more detailed examination of factors influencing networking.

Two multivariate regression analyses using lagged independent variables were conducted to control for temporal changes in networking and environmental factors (Hypothesis 3). Similar to the nonlinear models in Table 1,

the squared networking term was added to the second model. Results for these models (not included in Table 1) suggest that networking does not have a significant effect on goal attainment. In fact, the only variables with positive effects on goal attainment are past performance ($\beta = .32, p < .01$, for both models) and risk analysis ($\beta = .10, p < .05$, for both models). Also, the level of fit is considerably lower (adjusted $R^2 = .17$ for both models) compared with the base linear model and the nonlinear model in Table 1. In summary, these results suggest that, in this case, performance cannot be explained by time lag effects.

Case Study Analysis

In a nested analysis, model-testing case studies are used inductively to generate causal process observations and usually involve low-residual cases that are well predicted by the theory (Lieberman, 2005). In this case, the regression analysis showed that networking had a positive effect on organizational performance at the lower end of the scale but diminishing returns at mid and higher levels. Therefore, to gain deeper insight into specific actions and developments influencing collaboration, the study examines two municipalities at different levels of networking where networking has increased over time but with different performance effects. Networking in the first case (Robertsfors) increased from a low to a moderate level, which was accompanied by an increase in organizational goal

Figure 2. Scatter plot of selected cases with residuals in parentheses based on bivariate linear regression analysis. Note. Dependent variable: goal attainment scale, independent variable: networking scale. $\beta = .335$, $p < .01$, adjusted $R^2 = .11$.

attainment. In the second case (Kungälv), networking increased from a moderate to a high level, yet without any effect on goal attainment. Given the importance of networking as a prerequisite for performance, these two cases were included to unveil what factors and development have enabled and constrained collaboration. These cases are compared with a third case (Trelleborg), in which the relationship between networking and goal attainment deviates from the predicted nonlinear relationship. In this case, which was located at the higher end of the networking scale, the increase in networking had a positive effect on goal attainment. This case thus enables an assessment of what qualities may curb the complexity associated with increased collaboration. Figure 2 plots the cases with residuals in parentheses. Each case was reviewed using semistructured interviews with one actor per municipality to document how challenges of collaboration within the networks have been addressed over time.⁹

Case 1: Robertsfors. Robertsfors municipality has participated in three overlapping networks at the local and the regional level. Collaboration has improved as a result of improved coordination between organizations, which in turn has had positive effects in terms of joint planning and common activities. Meanwhile, challenges remain to include additional actors. These observations corroborate the results of the data analysis; although increased collaboration has had a positive effect on organizational goal attainment, additional interactions have been seen as a means to improve performance further.

What factors have made collaboration work in this case? One key factor is a shared perception among the participants regarding the payoffs of collaboration. Reaching agreement on the terms for collaboration has not been challenging; collaboration has developed naturally among individuals with close personal ties who meet on a regular basis. Another factor is a clear structure for decision making on matters involving financial resources. Most issues dealt with by the network—such as education and training—do not involve major financial costs, which in turn eliminate the potential negative impact of unclear decision mandates. Meanwhile, when support from superordinates has been required, action has been facilitated by direct links to decision makers. For example, local-government heads in the region have formed a working group to coordinate decision making across municipality boundaries. In this case, there has been considerable overlap between different constellations of actors where the same individuals meet regularly in different forums. Yet, the boundaries and responsibilities between these groups have been clearly defined. Collaboration has been facilitated by close interaction among local-level emergency preparedness coordinators.

The combination of a shared perception regarding joint payoffs from collaboration and a clear decision-making process has facilitated formulation of joint goals and activities. As the terms for collaboration have been agreed upon at an early stage, the participants have been able to move on to concrete action. For example, the actors have collaborated to develop joint planning, collaboration exercises, and a common methodology for risk analysis. Meanwhile, actors in this network still face a number

of challenges to further increase the payoffs of collaboration. Primarily, additional actors need to be included to heighten regional preparedness, which would also require commitment from all participants to clarify common goals. Other difficulties involve variability in attention and commitment of the actors in the network and of the political leadership in the municipalities that participate in the network.

Case 2: Kungälv. Collaboration in Kungälv has taken place within a local network of public agency representatives and a regional network of representatives from several municipalities and the County Administrative Board (regional). The local network—which coordinates emergency planning and crime prevention and consists of representatives of the police, the rescue services, and the municipality—has worked fairly well. Collaboration is described as unproblematic due to the fact that the participants are exclusively representatives of public authorities and thereby mandated to sign off on interorganizational agreements. By contrast, the regional network (“the Gothenburg Region”) appears to have been less effective.

In this case, networking has not had a positive impact on goal attainment and the trend has rather been toward greater uncertainty regarding terms and goals of collaboration. At a glance, this case is yet somewhat counterintuitive because many conditions that typically enable successful collaboration have actually been met. For example, the same individuals have been interacting repeatedly for some time and all actors have been willing to share resources to invest in common efforts. Furthermore, several actors have been engaged as coordinators and all actors have shared a responsibility to convene regularly. The participants have also agreed on resource-sharing and common working methods. Despite these favourable conditions, there has been a lack of progress in establishing clear terms for collaboration. Time and attention have therefore been devoted to managing collaboration *per se* rather than formulation of common goals and strategic planning.

Three factors appear to explain why collaboration has not worked in this case. First, no actor has taken overall responsibility to ensure agreement among the participants on the terms of collaboration. While the coordinating function has prioritized regular participation, no actor has taken on the role as boundary spanner to promote agreement on common goals. The fact that the participants have recently brought in external consultants to sort out the terms for collaboration supports this observation. Second, variation in mandates and external support has hampered joint decisions and development of a common network agenda. Municipality representatives with relatively weak mandates and low support from superordinates have often been unable to invest in common network agreements. Actions that require joint resources have thus depended on external approval, which have stalled joint decision making within the network. Third, lack of common risk perceptions has militated against network integration. Given that this particular region is

relatively large (14 municipalities are represented), the network faces a wide range of risks, which has complicated the task to identify common goals and actions targeting specific problem areas.

Case 3: Trelleborg. The interview confirms that the network environment of Trelleborg is quite complex and that it has grown in the recent years. Trelleborg municipality is represented in four different collaboration networks, including two regional and two local arrangements. In practice, there is considerable overlap between these networks in terms of individual representation and the issues that are being discussed. Nevertheless, contrary to the diminishing returns hypothesis, these developments had a positive effect on goal attainment.

The interview suggests four mechanisms that explain this pattern. First, the participants have early on agreed on the terms for collaboration, which enabled development of common goals related to specific problem areas. By clarifying rules for interaction early, the participants have been able to shift attention to formulation of shared goals. Second, a common narrative has been established based on high risk awareness among the participants. This narrative, which derived from systematic documentation of hazards within and outside the region, emphasized continuous and collaborative planning for high risk–low chance events. Having this shared priority in turn facilitated agreement on a few risks that the network should prioritize. Third, the participants have adopted a relaxed attitude toward free riding, guided by a mutual understanding that participation in joint network activities does not need to be equally distributed across all actors. Strong personal relationships and high levels of trust have facilitated an attitude among the participants that everyone contributes when he or she can. The fourth condition is a joint strategy for network development, including practices to cope with changes in representation. Based on the insight that personal relationships are the cornerstone of collaboration, a common routine has been implemented to include new individuals into the network. Accordingly, changes in the composition of the network are usually followed by efforts to clarify the terms of collaboration. Also, the participants have established practices that deliberately seek to reduce dependence on certain individuals. The idea is that open and continuous information-sharing will increase the collective capacity of the network as a whole and thereby makes it less dependent on certain individuals.

Case study summary. Interviewees representing municipalities at both ends of the networking scale (Cases 1 and 3) confirm that interorganizational collaboration has been important for organizational crisis management capacity. In both these cases, municipalities have benefited from participating in joint actions to plan for and respond to extreme events. Conversely, the third case (Case 2) demonstrates that problems associated with poor collaboration may constrain goal attainment; in this case, the

terms of collaboration have remained unclear, which seems to explain why further increase of networking has not increased organizational performance. Together, the three cases help specifying general assembly mechanisms that network actors can utilize to overcome transaction costs, which in turn might generate payoffs for organizations. First, the cases indicate that if the network participants collectively agree on rules and structures for collaboration, they can move on to identify joint operational goals and action plans. But, if the initial terms of collaboration remain undefined, the formulation of common goals will be difficult. Uncertainty is likely to feed frustration and increase doubts among participants regarding the benefits of collaboration. Second, harmonization of risk perception has a positive effect on organizational goal attainment. Generally, most networks face some level of divergence among the participants regarding the problems they are set to address. The cases analyzed here suggest that overcoming these differences is one key to viable collaboration. Evidence from the high performing cases suggests that this can be achieved by establishing a common priority to plan for unscheduled events as well as agreement on a few risks that should be the target of collaboration. Third, high performing networks are based on viable and relatively stable interpersonal relationships, which confirm the importance of informal networks for sustaining collaborative arrangements (cf. Isett, Mergel, LeRoux, Mischen, & Retheymeyer, 2011). The findings confirm the well-known importance of trust and the role that repeated interaction plays in shaping viable collaboration. Stable relationships reinforce collaboration and commitment to network goals and reduce negative effects of free riding. At the same time, the analysis suggests that personal relationships are not sufficient. For example, the Kungälv case illustrates that for interpersonal trust to support collaboration, it needs to be accompanied by firm leadership and clearly defined terms of collaboration. Fourth, collaboration depends on the ability to coordinate joint decision making among actors with different mandates. Some network participants are constrained by limited mandates and depend on approval by superordinates to sign off on joint network decisions. In the Kungälv case, the lack of such coordination had a negative impact by slowing down decision making at the network level. By comparison, actors within the Robertsfors network solved this problem by coordinating decisions involving financial commitments with a group of local-government heads representing different municipalities. Negative effects of limited mandates can thus be bypassed by establishing direct links to actors with decision-making power. Another way to elude this problem is to limit the number of decisions that require approval by superordinates, as was the case in Robertsfors.

Conclusion

This study of local-level networking in the crisis management domain in Sweden has explored the assumption (Hypothesis 1) that more external networking brings costs, which is likely to generate diminishing or negative returns for organizations

at higher levels of networking. Results confirm that networking had a significant positive effect on goal attainment for municipalities participating in networks with relatively few participants and collaboration venues whereas none or considerably smaller effects were noted for municipalities participating in more complex networks.

The study explores the assumption that actors do not have infinite resources, and there is a limit to the payoffs from additional networking (Hicklin et al., 2008; Meier & O'Toole, 2003). Given the findings of this study, one may speculate on the generalizability of this assumption—particularly in the context of crisis management, which is characterized by relatively diffuse ends and vague payoffs. It is possible that managers in this domain may continue investing resources in networking with little consideration of the costs associated with increasingly complex networks as costs might be difficult to discern. Alternatively, managers might be preoccupied with improving collaborative processes by trying to get more actors involved and increasing the intensity of collaboration, while devoting less attention to specifying and achieving common goals (cf. Rogers & Weber, 2010). Yet, the study confirms that some of the challenges encountered at higher levels of networking can be mitigated by proactive network change management (Hicklin et al., 2008).

Findings reported here should be interpreted with some caution. One limitation is that the analysis measures networking as a function of interorganizational contacts and venues while excluding different levels or types of networking activities. Although this measure facilitates comparison, it ignores the fact that different organizations provide different types of resources, and are therefore not equally valuable (Torenlvied, Akkerman, Meier, & O'Toole, 2012). Certain combinations of organizations might be more conducive to performance and/or better at mitigating negative returns than others. Also, due to lack of comparative data, the study does not investigate how different networking activities may influence performance, which is a recurrent limitation in large-n network research (Torenlvied et al., 2012). In addition, the pattern of diminishing returns demonstrated here only applies in a period of 2 years, which is a limited time span given collaboration as a long-term undertaking—especially in the context of building crisis management capacity (cf. Goldstein, 2012). Hence, it may be that the relationship between networking and organizational performance takes on different shapes across unique network configurations and in different time periods (Bodin & Nohrstedt, 2016; Nohrstedt & Bodin, 2014).

By documenting the relationship between networking and organizational performance, this study advances research on collaborative crisis management, which tends to describe the structure of collaborative networks without considering the implications of networking. However, the study does not detail the causal pathways by which external networking might influence organizational crisis management capacity and, in turn, we do not really know what mechanisms

moderate the nonlinear relationship. This limitation echoes a research gap in the literature concerning what factors and managerial qualities might be helpful to mitigate potential negative effects (e.g., the risk of conflict and difficulties to build trust and commitment) and to exploit the potential benefits (e.g., diversity in knowledge, expertise, and resources) associated with increasingly complex collaboration networks (cf. Rogers & Weber, 2010). Identifying those intervening causal mechanisms and processes is an important avenue for future research in the crisis management domain and beyond.

These limitations aside, the comparative case study unveiled a set of network assembly mechanisms conducive to collaboration, including stable interpersonal relationships, clarification of the terms of collaboration, shared problem perceptions, and coordination of joint decision making. These mechanisms are neither novel nor unique to crisis management work in Swedish municipalities; on the contrary, these mechanisms are frequently cited in the literature as essential properties of well-functioning network arrangements (e.g., Ansell & Gash, 2008; Emerson, Nabatchi & Balogh, 2011). Nevertheless, this analysis underscores the importance of incorporating a more fine-tuned conception of managerial quality into empirical analyses of networking.

Another issue that calls for more detailed examination is the impact of networking on more specific outcomes associated with crisis management. Whereas the measure used here captures generic organizational capacities to plan for and cope with extreme events, future research might assess performance in relation to more specific tasks commonly associated with collaborative crisis management. For example, what is the impact of networking on the ability of collaborative response systems to diagnosing fast-moving situations correctly? How does networking influence swift collective and organizational decision making under conditions of time pressure, uncertainty, and collective stress? And what is the role of networking in facilitating critical, nondefensive, and evidence-based lesson-drawing to enhance crisis management capacity for the future? Empirical research in these areas will offer useful insights into the relationship between networking and crisis management.

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Notes

1. The notion of networking applied here, as defined by the Meier-O'Toole model, is distinguished from network structure (structural network attributes such as density, centralization, and the occurrence of cliques) and network governance (the use of institutions and authority to allocate resources and coordinate joint actions) (Provan & Kenis, 2008).
2. The formal positions of the respondents vary across municipalities and include, for example, preparedness coordinators, planners, heads of security, safety, and rescue services.
3. In addition, the Durbin-Watson statistic (1.88) indicated no serial correlation.
4. The factor analysis showed that all four items loaded positively on the first factor (explaining 49% of the variance, eigenvalue 1.95). No other factors were significant.
5. There is little consistency in the literature regarding measurement of networking. Whereas some studies (Hicklin, O'Toole, Meier, & Robinson, 2009) rely on scales based exclusively on reported contacts, other studies use additive scales combining contacts with the number of interactions (Meier & O'Toole, 2003) or the number of activities (McGuire & Silvia, 2010).
6. The survey question stated, "With what actors does your municipality collaborate with to achieve coordination before and during extraordinary events?"
7. Data on coordination resources were covered by the survey while information on central resources was retrieved separately from the Swedish Civil Contingencies Agency.
8. Bivariate correlations on the relationship between goal attainment and past performance (goal attainment in the previous year) still indicate substantial variation over time (Pearson correlation coefficients in the range of .07-.48). One possible explanation for this variation is that the annual evaluation of the crisis management capacity of Swedish municipalities is relatively nascent (introduced in 2006) and that we therefore would expect gradual improvements to be relatively frequent.
9. Three interviews were conducted: Johanna Nordström (preparedness coordinator of Umeå municipality, previously responsible for Robertsfors municipality), Peter Svensson (coordinator for security and preparedness development, Kungälv municipality), and Kent Naterman (head of rescue services, Trelleborg municipality).

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