Exploring the Determinants of Network Effectiveness: The Case of Neighborhood Governance Networks in Beijing

Abstract

Based on the models proposed by Provan and Milward (1995) and Provan and Kenis (2008), this paper employed a mixed-methods approach to study the determinants of the effectiveness of governance networks. The paper is based on 22 neighborhood governance networks in Beijing with each network consisting of public, business and civic organizations. Linear regression was used to identify independent variables that exert statistically significant influence over network effectiveness, and the fuzzy set Qualitative Comparative Analysis was used to investigate the complex interactions between explanatory variables. The analysis revealed different but functionally equivalent configurations of causal conditions that led to network effectiveness, and showed that configurations of factors leading to network effectiveness were different from those leading to network ineffectiveness. The results also suggested that network structural characteristics such as network centralization and density are neither sufficient nor necessary conditions for network effectiveness. In contrast to Provan and Milward's (1995) findings, the results suggest that network density is more important than network centralization in affecting effectiveness in small networks. Resource munificence was identified as an "almost always" necessary condition for network effectiveness.

INTRODUCTION

Evaluating network effectiveness and studying its determinants have been an important topic in network research (Provan and Milward 1995, Provan and Kenis 2008, Meier and O'Toole 2003). Provan and Milward (1995) proposed a preliminary theory of network effectiveness by examining the effects of environmental factors and network structural characteristics. A series of studies followed their original research and examined the effects of factors such as forms of network governance, network age, and internal trust (Provan and Milward 1995, Provan and Kenis 2008, Provan and Sebastian 1998, Raab, Mannak, and Cambré 2013). Another school of scholars studied the roles of agency with a special focus on network management (Meier and O'Toole 2003, Juenke 2005). A number of variables such as managerial networking (Meier and O'Toole 2003, 2001), management quality (Meier and O'Toole 2002), personnel stability (O'Toole and Meier 2004) and network leadership (McGuire and Silvia 2009) have been examined.

The current literature is enlightening in many ways, but it is not without its problems. Though recently an increasing number of studies have used medium to large-N samples (O'Toole and Meier 2004, Raab, Mannak, and Cambré 2013, Verweij et al. 2013), single case studies or comparative case studies were once the dominant approach to develop theory (Isett et al. 2011, Meier and O'Toole 2003, Provan, Fish, and Sydow 2007) simply because it is time- and resource-consuming to collect data on networks. Conclusions drawn from case studies are inspiring, but their generalizability is compromised. A related problem is that configurational theories of network effectiveness are still in the nascent stage. Conventional regression models are limited in testing complex interactions between explanatory variables

(Fiss 2011). Though scholars have started to employ new methods such as set-theoretic methods to build configurational theories (Raab, Mannak, and Cambré 2013, Verweij et al. 2013), more research is needed in order to cover different research contexts and to test the effects of different factors. Thirdly, most theoretical development has been based on the US or European contexts. We know little about whether these models can hold in broader contexts.

This paper attempts to further the research on network effectiveness by developing configurational theories of network effectiveness. A mixed-methods approach was employed. The fuzzy sets Qualitative Comparative Analysis (fsQCA) enables us to go beyond simple linear understandings and explore equifinality, causal asymmetry and complex interactions among explanatory variables. In addition, the paper is based on neighborhood governance networks in Beijing, which provides an opportunity to test the external validity of propositions and models developed in American or European contexts.

THEORETICAL FRAMEWORK

Although considerable progress has been made in the current literature on network effectiveness, there are hardly any well-established and generalizable theories. However, we do have some influential models of network effectiveness to draw on. Provan and Milward (1995) did a pioneer study on four service-delivery networks and developed some configurational propositions involving structural and environmental factors (See Figure 1 for the full model). The model was further developed by Provan and his colleagues (Provan and Sebastian 1998, Provan and Kenis 2008). For example, Provan and Kenis (2008) furthered the research by proposing a contingency theory of network effectiveness. They explored the best fits between forms of network governance and other important network characteristics such as trust, number of participants, and goal consensus.

Another school of scholars focused more on network management (Agranoff and McGuire 2001, Rethemeyer and Hatmaker 2007). For example, O'Toole and Meier (1999) developed the O'Toole-Meier model and tested the effects of a number of network management variables, including managerial networking (Meier and O'Toole 2003, 2001), management quality (Meier and O'Toole 2002), personnel stability and management stability (O'Toole and Meier 2004) , the time that managers spend in networks and management tenure (Juenke 2005). Scholars have also investigated network management variables such as network leadership (McGuire and Silvia 2009) and the identification of and connection to crucial actors (Klijn, Steijn, and Edelenbos 2010).

The Provan-Milward model was employed as the major theoretical framework of this paper for several reasons: First, the model examines the interaction between structural characteristics and environmental factors, which is also the major focus of this paper. It is probably the best known model in the network effectiveness literature, providing a solid theoretical foundation for this research and offering opportunities to further development. Secondly, unlike some studies that focus on dyads or substructures (Chen and Graddy 2010, Meier and O'Toole 2003), this paper uses the network as the unit of analysis, as does the Provan-Milward model. One objective of this paper is to further the research on networks at the network level and to respond to the lack of systematic studies on networks as a whole (Isett et al. 2011, Provan, Fish, and Sydow 2007).

[Insert Figure One here]

Network integration

"Structure matters" has long been a central tenet of network research. Network integration is probably the most commonly studied structural variable in the network effectiveness literature. Provan and Sebastian (1998) argued that integration must occur if networks are to perform well, although scholars have not reached a consensus on the relative importance of different forms and levels of integration. Integration contributes to effectiveness because it can reduce fragmentation (Provan and Milward 1995, Jennings Jr and Ewalt 1998), create common norms, enhance communication and contain opportunistic behaviors. Two types or logics of integration have often been studied: density-based integration and centralized integration. Density-based integration is measured by a network density score and identifies how cohesive a network is. In a dense network, member organizations are closely connected to each other and are thus more likely to collaborate. Centralized integration measures the degree to which a network's ties are focused on one organization (Scott 2012). Central organizations can better coordinate other organizations to achieve network goals (Provan and Milward 1995, Raab, Mannak, and Cambré 2013). Density-based integration and centralized integration are two different or even opposite logics – the former is a mechanism of decentralized collaboration, while the latter is a mechanism of centralized coordination. The tension between the two mechanisms should not be ignored (Provan and Milward 1995). It may be difficult to coordinate densely-connected organizations integrated in a decentralized way (Provan and Milward 1995, Morrissey et al. 1994). Simultaneous integration through the two mechanisms may make a network unnecessarily complex and cause it to be less effective (Provan and Milward 1995). Since networks may be more effective if they are integrated through one mechanism, an interesting question arises: which mechanism is more effective? Provan and Milward's (1995) original model and other studies showed that centralization is more favorable to network effectiveness (Provan and Milward 1995, Raab, Mannak, and Cambré 2013).

Stability

Resource dependence theory argues that organizations have to manage their environments in order to reduce uncertainties and maintain a dependable supply of critical resources (Pfeffer and Salancik 1978). A turbulent environment may hurt organizations' efforts to maintain predictable supplies of resources and greatly increase the difficulties of management. The environment produces similar impacts on networks. Unstable environments first threaten the flow of resources to all network members, compromising their abilities to fulfill respective responsibilities in service delivery or governance. Second, unstable environments may impede the collaboration between network members. For example, attempts to make systemwide changes in the distribution of resources may create uncertainties and disrupt existing communication channels or collaborative relationships (Provan and Milward 1995). Third, interorganizational trust may be quite low in uncertain environments (Hicklin 2004, Lambright, Mischen, and Laramee 2010), which may hinder collaboration. Networks in unstable environments may have a high turnover rate of member organizations. Organizations may be uncertain about whom to collaborate with on a long-term basis and thus lack the incentive to invest in relationship building.

Resource munificence

Resource munificence is of obvious importance to organizations and interorganizational networks. Resources in the form of funding and expertise enable network members to fulfill their responsibilities, coordinate action and collaborate with each other in service provision. We would generally expect resource munificence to have a positive influence on network effectiveness, which is supported by a number of studies (Conrad et al. 2003, Bazzoli et al. 2003). Provan and Milward (1995) pointed out that this relationship may be nonlinear because of the moderating effect of structural characteristics and environmental factors. Raab, Mannak and Cambré's (2013) study partly supported resource munificence as an INUS condition (Insufficient but Necessary part of a condition which is itself Unnecessary but Sufficient) and found that the configuration of resource munificence, centralized integration, network stability and at least 3 years of network history would lead to effectiveness.

Neighborhood SES

The Provan-Milward model was modified to fit this research context. Neighborhood socioeconomic status (SES) was added to the model because it may be particularly important in influencing the effectiveness of neighborhood governance networks. Homeowners and HOA board members in high-SES neighborhoods are usually lawyers, journalists, professors or other professionals with high levels of human capital. High-SES neighborhoods may be able to hire high-end property management firms. Therefore, agents in these neighborhood networks tend to have higher levels of skills and expertise in resolving conflicts and making collaboration work. In addition, these agents often have the social capital that may contribute to network effectiveness in various ways. For example, when neighborhood organizations run into thorny problems, some agents may come to the rescue by bringing in new resources, knowledge or actors. Some scholars conceptualize the social and human capital as nonfinancial resources that may affect the effectiveness of collaboration (Weiss, Anderson, and Lasker 2002).

The original Provan-Milward model included the existence of external control as a key explanatory variable; however, in this research context, all networks were initiated by network members who were relatively independent of each other; no external organizations controlled these networks. This variable was thus dropped. Network governance was considered to affect network effectiveness (Provan and Kenis 2008), but it was also dropped because all these neighborhood governance networks had almost the same internal governance structure – shared governance. Some other factors, such as formalization, rules, and network size, have been found to affect network effectiveness (Zakocs and Edwards 2006, Turrini et al. 2009). These variables were naturally controlled in this research context. For example, the influence of institutions was controlled because all cases under study were in Beijing and thus were subject to the same national and municipal laws and regulations. Network sizes were usually quite small, ranging from four to seven members. Based on the examination of the Provan-Milward model and other potential variables, the above four variables, network integration, stability, resource munificence and neighborhood SES, were used as key explanatory variables in this research.

RESEARCH CONTEXT: NEIGHBORHOOD GOVERNANCE NETWORKS

Governance networks, or area-based policy networks (De Rynck and Voets 2006), are webs of interdependent public, business and nonprofit organizations that work together to address a wide range of policy problems within certain geographical areas (Klijn, Steijn, and Edelenbos 2010, Isett et al. 2011). Governance networks combine policy formulation and implementation together in the governing of an area such as neighborhoods or cities (Isett et al. 2011, Rethemeyer and Hatmaker 2007). There are usually no agreements or contracts that bind these organizations together – they just interact with one another on an ongoing process, similar to the "serendipitous network" described by Kilduff and Tsai (2003). The degree of formalization is usually quite low. Partly due to the fact the governance involves the distribution of resources, internal conflicts of these networks may be high because members may try to maximize their own interests.

This study focuses on neighborhood governance networks in Beijing, formed after the Housing Reform. In the planned economy era, housing was provided through employment by the government or state-owned enterprises. Street Offices (SOs) and Residents' Committees (RCs) dominated neighborhood governance. Street Offices are the lowest level of government, and are responsible for the administration of small parts of urban areas. Residents' Committees are theoretically self-governing civic organizations, but they are usually controlled by Street Offices and work as the most basic unit of social management.

Housing reform, which was launched in the late 1990s and created a real estate market, gave rise to new organizations in urban neighborhoods. Commercially developed condominium neighborhoods have become the dominant form of neighborhood in contemporary Beijing. People living in condominium neighborhoods are allowed to establish Homeowners' Associations to represent them in the management of communal properties such as lawns, shared elevators and communal facilities. Property management firms are hired to provide management services. Together with developers, these private organizations, which are based on property rights and market transactions, have become important stakeholders in urban neighborhoods. Government entities have to work with these new players and operate in a network environment.

These neighborhood governance networks have several defining features. The first and most important feature is interdependence. Interdependence arises partly from the complex interactions between political power and property rights in neighborhoods. Theoretically, private property rights set boundaries to political power, but political power still exerts significant influence over property rights because property right laws are not well enforced. In these neighborhood networks, no organization has the resources or power to govern on its own; organizations have to cooperate with one another in decision making and service delivery. For example, government entities do not have the absolute power that they used to have in the planned economy era simply because they are not property owners. Many government operations have to get the consent of property owners as a precondition. For instance, setting up a billboard for outreach or propaganda purposes requires the consent of homeowners. In some cases, governments even have to pay certain fees to HOAs for the billboard. On the other hand, homeowners are well aware that local governments including Street Offices can effectively influence their property rights in various ways. For example, governments have considerable power in urban planning and zoning, and can thus affect a neighborhood's surrounding environment and land use. Government programs in public safety and social security also directly affect the homeowners' quality of life. Therefore, HOAs may not really charge fees or obstruct government operations in the expectation that governments would reciprocate when needed. Though formal contracts may not exist, complex interdependence connects these organizations.

The second feature relates to the manner in which governance networks combine policy making and implementation (Isett et al. 2011). This differs from service-delivery networks which usually provide only a certain kind of service. For example, to maintain neighborhood safety and reduce property and violent crimes, HOAs, Residents' Committees, and management firms may need to decide whether certain measures need to be taken, such as installing access control systems at entrances or checking IDs manually. Once a decision is made, management firms may be responsible for implementing the decision, while HOAs may provide necessary financial resources and monitor the services. Residents' Committees and Street Offices may be responsible for communicating and coordinating with police agencies on neighborhood safety. The lack of effort from any part would compromise neighborhood safety service.

The third feature of these networks is the fact that they are place-based, or more specifically, neighborhood-based. Core organizations operate within neighborhood boundaries clearly defined in the commercial development processes. One neighborhood has only one HOA, and the HOA has no property rights beyond neighborhood boundaries. Within neighborhoods, these organizations will always exist unless there are dramatic institutional changes. Therefore, the interactions between these organizations resemble "repeated games."

Interorganizational relationships are not necessarily cooperative; in many cases, the relationships are conflictive. These organizations take different strategies of engagement to maximize their own interests and influence. Organizations may choose not to cooperate in order to compromise others' efforts. For example, partly due to the poor enforcement of laws and regulations related to property rights, government entities sometimes form alliances with property management firms or developers to infringe on homeowners' communal properties. These alliances may gain enormous revenue from selling or renting out communal properties without giving homeowners compensation. They may try to stop homeowners from establishing HOAs in order to keep their dominant status in neighborhoods.

These networks produce quite different impacts on their neighborhoods. Some networks work well and their neighborhoods are clean, safe and well maintained, while other neighborhoods are governed badly and their property values have gone down – the average price per square meter can be lower than that of similar neighborhoods by as much as 2,000 RMB (about $ 330). We are thus given an ideal context to study what cause the differences in the effectiveness of neighborhood governance networks.

RESEARCH METHODS, DATA AND OPERATIONALIZATION OF VARIABLES

Research Design

This paper employed a mixed-methods approach. Linear regression was first used to identify factors that exert statistically significant influence over network effectiveness. The fuzzy set Qualitative Comparative Analysis (fsQCA) was then used to capture synergistic effects between factors. This mixed-methods approach allows us to utilize the strengths of each method and to better explore causal complexities. Findings from the two methods can be cross-validated and provide different perspectives on the determinants of network effectiveness.

Regression analysis is limited in capturing interaction effects among variables. Complicated interaction effects are often not known to researchers (Ragin 1989) and thus cannot be constructed or tested. Moreover, three-way interaction terms or higher order terms are extremely difficult to interpret, making three-way interaction terms the actual boundary of regression analysis (Fiss 2007). However, as Fiss (2007) pointed out, there are no good reasons to exclude the possibility of three factors combining together to affect outcomes. The fsQCA method was employed to overcome these problems. Based on Boolean algebra, the fsQCA method is inherently qualitative and enables structured and focused comparisons of a large number of cases (Ragin 2008). It treats cases as configurations of characteristics, and does not try to isolate the effects of individual variables (Ragin 1989, Fiss 2007). In addition, it enables the analysis of equifinality, which means that there may be multiple causal paths that lead to certain outcomes (Fiss 2007, 2011).

Sampling and Data Collection

The fsQCA method is based on the logic of combinatorial causation and has different requirements for case selection. As Ragin (1989) argued, “when causal arguments are combinatorial, it is not the number of cases but their limited variety that imposes constraints on rigor” (p.13). In other words, the fsQCA method requires that cases should exhibit as many logically possible combinations of factors as possible. A purposeful sampling was employed in order to meet the above requirement. Our collaborator in Beijing, a nonprofit organization specializing in homeowners' advocacy, helped to contact the first six neighborhoods. Starting from this initial sample, I asked our interviewees to introduce me to new neighborhoods that exhibited combinations of network effectiveness and causal conditions that I had not covered. I stopped at 22 cases when I repeatedly came across similar cases and could hardly identify new patterns. This moderate number of cases allowed me to manage in-depth knowledge of each case and variations across cases, which is another key requirement for the successful application of the fsQCA method (Ragin and Fiss 2008).

Semi-structured interviews were used as the major approach to collecting data. The structured part had standardized questions on the outcome and causal conditions. Detailed measurement of the outcome and causal conditions were discussed in the following section. Data collection did not stop when interviewees assigned values to all the questions. A deep understanding of each case was necessary for the fsQCA analysis. Therefore, I asked interviewees for their reasons behind their choices, which helped to stimulate in-depth dialogues about neighborhood governance. Open-ended questions were also raised during the interviews. Each interview took about 2-3 hours. In addition, I visited each of the 22 neighborhoods in order to get first-hand experience and to double-check the information gained from interviews.

Operationalization of the outcome and causal conditions

Measuring Effectiveness Measuring effectiveness is the first major task of this research. Network effectiveness was defined as "the attainment of positive network-level outcomes that could not normally be achieved by individual organizational participants acting independently" (Provan and Kenis 2008, 4). Measuring effectiveness is a normative task (Kenis and Provan 2009). The reasons are that, first, networks have multiple constituents and these constituents have different beliefs about the criteria of effectiveness (Provan and Milward 2001, Herranz 2010); selecting the preferences of one group of constituents over those of another group, or assigning weights to the preferences of different groups, is a normative decision; second, the criteria for measuring effectiveness are normative (Raab, Mannak, and Cambré 2013, Kenis and Provan 2009). Simon (1976) argued that any assessment criteria are elements of value rather than elements of facts. These elements of value cannot be derived from facts or proven empirically. Therefore, there are hardly any scientific ways to determine if one criterion is superior to another (Kenis and Provan 2009). Kenis and Provan (2009, 444) argued that network performance is "a function of external criteria used to assess the network." Since there are no completely scientific or objective criteria to measure effectiveness, researchers should be conscious of the issue and be explicit about the criteria that they select.

Provan and Milward (2001) made a major contribution to the network effectiveness literature by specifying three levels of analysis: community, network and organization/participant. Researchers usually have to select one level because measuring effectiveness at three levels is extremely burdensome (Raab, Mannak, and Cambré 2013). The social impacts that these networks produce should be important indicators of their effectiveness because the major goal of establishing these networks is to solve some social problems or serve a certain segment of the population. Provan and Milward (2001) argued that the effectiveness of these networks should be "judged by the contribution they make to the communities they are trying to serve" (Provan and Milward 2001, 416). Raab, Mannak, and Cambré (2013) also preferred the community-level criteria because "effectiveness at community level is the cumulative outcome of processes and results on the organizational and network levels" (p.7). This paper took a similar approach by measuring community-level effectiveness, focusing on the impacts of these networks on residents' quality of life.

The next step was to find criteria that could measure community-level effectiveness. Different groups of constituents may have diverse views and priorities that are hard to reconcile. In this context, street-level governments may prioritize neighborhood stability; residents may value things like safety and cleanliness; developers and property management firms may care most about profits. A choice had to be made to prioritize one group of constituents. In the study of health service networks, Provan and Milward (1995) selected client wellbeing as the primary measure of effectiveness because it was "most certainly a top priority" (p.8) of all constituency groups such as clients, families, funding agencies, and policy makers. In this research, homeowners' priorities were selected for two reasons: first, homeowners legally own these neighborhoods as the owners of private and communal properties. They live in these neighborhoods, and both their quality of life and property values are deeply affected by the governance networks. Compared with other constituents, they are affected the most by these networks and they care the most about the effectiveness of governance. In addition, homeowners have first-hand and day-to-day experience with how neighborhood governance networks work. Second, serving these homeowners is the common goal of all neighborhood organizations, though it may be symbolic for some. For street-level governments, "serving the people" is the official ideology; for HOAs, serving homeowners is why they are founded in the first place; for developers and property management firms, serving homeowners is how they get their revenue.

A composite measure consisting of three items: neighborhood safety, cleanliness and the maintenance of important facilities, was used as the final measure of effectiveness. This composite measure was used by both external and subjective evaluations of each network, and then scores of the two evaluations were added up. The final score of network effectiveness can range from 0 to 56. Therefore, this is a multitrait-multimethod approach (Campbell and Fiske 1959). The three items of the composite measure are homeowners' central concerns and are closely tied to the quality of life and property values. The services of sanitation, safety and facility maintenance are usually jointly provided by neighborhood organizations, and thus can reflect the effectiveness of neighborhood governance networks. For example, property management firms may be hired to directly produce services, but HOAs provide financial resources and monitor service qualities. Street-level governments and Residents' Committees have programs on safety and sanitation, so they are also important participants. In addition, as the representation of public power at the neighborhood level, these government entities play very important moderating roles in neighborhood governance.

Subjective and external evaluations were integrated in order to overcome the limitations of each method (Bommer et al. 1995, Wall et al. 2004). For example, due to interviewees' personal bias and bounded cognitive abilities, subjective measures of performance are prone to contamination and may contain sizeable random errors (Campbell 1991, Meier and

O'Toole 2013). External evaluations are less affected by personal bias, but evaluators do not have the deep knowledge of these governance networks and thus may capture only the surface. Therefore, combining the two methods may help to overcome the limitations.

Network effectiveness was first measured by homeowner leaders' subjective evaluations. Using perceived outcomes as a measure of effectiveness has been commonly used in the current literature (Klijn, Steijn, and Edelenbos 2010, Provan and Milward 1995, Zakocs and Edwards 2006). Elected homeowner leaders were selected as interviewees because they were more familiar with their neighborhoods than were ordinary homeowners. In neighborhoods where no homeowner leaders had been elected yet, leading homeowner activists were interviewed. They were asked to rate three statements about safety, sanitation, and housing maintenance, such as "my neighborhood is safe." Responses were constructed using a 7-point Likert scale with 7 representing strongly agree and 1 representing strongly disagree.

External evaluations were based on photographic evidence. Ideally, external evaluators should visit each neighborhood and do the evaluations on the scene. However, limited resources made this option impossible. Since conditions of sanitation and facility maintenance were visible, the photographic method can serve as an alternative way of evaluation. Photos of specific targets such as garbage cans, neighborhood roads, lawns, fire and recreational facilities were taken. Evaluation standards were written and made available to two independent coders. Coders conducted evaluations by comparing the photos of these specific targets. Safety should also be externally evaluated. The reported number of crimes in each neighborhood was an ideal measure of safety, but local Bureaus of Public Safety refused to provide the statistics. As a remedy, I evaluated neighborhood safety on a 7-point scale based on my personal observations and the experience of entering each neighborhood. Two key criteria that I used were whether special passes or registration were required at the entrances and whether there were security personnel patrolling the neighborhoods.

Different evaluations were added up to construct a composite measure, which raised questions of measurement reliability and construct validity. Appendix One provides the full technical details of a series of statistical tests including bivariate correlation coefficients, Cronbach's alpha and intraclass correlation coefficients (ICC). Table One in Appendix One shows good internal consistency reliability with Cronbach's alphas ranging from 0.79 to 0.93 and good inter-coder reliability with ICC ranging from 0.61 to 0.87.

To establish convergent validity, the correlation coefficients of the same trait measured by subjective and external evaluations should be statistically significant and sufficiently large (Campbell and Fiske 1959). The tests showed that the composite measure had a good convergent validity. The correlation coefficients ranged from 0.433 to 0.996 and all of them were statistically significant at the 5% level. However, we should note that the correlation coefficients between subjective and objective evaluations ranged from 0.433 to 0.612, which were only moderately high. The correlation coefficients found in this research were comparable to those found in the management literature (Bommer et al. 1995, Heneman 1986).The meta-analysis of Bommer et al. (1995) showed that the corrected mean correlation between subjective and objective measures in his sample of 50 published papers was only 0.389, and similarly Heneman (1986) reported a corrected mean correlation of 0.27 in his meta-analysis. Since the ranges of coefficients are common in the literature and they are considered valid (Wall et al. 2004), the moderately high coefficients were not considered as a serious threat to convergent validity of the integrated measure in this research.

Causal Conditions/Independent Variables Causal conditions in this research were based on the above theoretical framework. The first causal condition was *network integration.* The effects of two forms of integration, centralized and density-based integration, were examined separately. The network generator question was "Can you list the neighborhood organizations that you are collaborating with or collaborated with recently on neighborhood affairs?" Interviewees listed the organizations that they collaborated with, which were verified in subsequent interviews with organizations that were mentioned. Since collaboration is symmetrical in nature, it does not make much sense to have asymmetrical collaborative relationships. If there were inconsistencies or asymmetrical relationships, I asked interviewees to clarify how they collaborated and decided whether it counted as a collaborative relationship. In the end, symmetrical collaborative networks were constructed based on these interviews. Centralization scores and density scores were calculated with UCINET. Centralization scores were based on Freeman's degree centrality, which is a measure of local centrality. Therefore, these centralization scores measure the degree to which one or a few organizations have many links in networks.

Resource munificence measured the availability of financial resources in each network to provide sanitation, safety and maintenance services. Resource munificence was measured by the percentage that financial resources could cover the cost of service provision. This information was mainly collected from the financial records that each property management firm publicizes and I also double checked with homeowner leaders. Resources in these governance networks come mainly from property management fees that homeowners pay and revenues generated from communal properties. In most neighborhoods, property management fee is the major source of income. The fee rate is set in contracts that homeowners sign collectively with their property management firms. The approval of a certain percentage of homeowners (usually 2/3) is needed in order to change the rate. Pre-determined rates often cannot not keep up with the changes in economic conditions (e.g. inflation), but the procedural requirement makes it difficult to adjust rates in a timely manner. As a result, many neighborhoods suffer from inadequate resources. In some neighborhoods, communal properties can generate a considerable amount of revenue. For example, some community space can be rented out to small businesses to generate rents. Obviously this part of revenues is mainly determined by market conditions such as locations and business opportunities. On the other hand, costs related to personnel, utilities, and facility maintenance are incurred in the process of providing services. In our study, both revenues and costs are exogenous to network effectiveness because they are largely determined by market conditions or contracts.

The third causal condition was *network stability*. It measured the degree of stability of the environments in which networks were embedded. The key criterion was whether network members were proposing or making any changes to the distribution of interests and resources. The information was gained from interviews. It was a binary variable with 1 representing the fact that some members were proposing or facilitating such change. Apparently such changes are very likely to threaten the interests of some network members, reduce mutual trust and create conflicts. A typical example was the turbulence associated with HOAs' firing of property management firms. In some cases, property management firms refused to cede control, requiring that remaining disputes with HOAs be resolved. What typically happened was that the quality of service plummeted; prolonged disputes greatly harmed the effectiveness of governance.

The last causal condition was *neighborhood socioeconomic status (SES)*, which was measured by the average price per square meter in recent apartment sales. This indicator has been used in other studies as a predictor of neighborhood SES (Wang, Yin, and Zhou 2012). We expect that people who can afford high housing prices belong to high SES groups.

ANALYSIS AND RESULTS

Summary statistics

Network analysis was conducted with UCINET. Table 1, Table 2 and Table 3 in Appendix Two present summary statistics, density and centralization scores, and correlation coefficients between variables. Network density ranged from 0.4 to 1 with a mean of 0.65. A density score of 1 suggested that every possible link between organizations existed, indicating that organizations were closely working together. In contrast, 0.4 suggested organizations did not cooperate with one another very well because only 40% of the possible links existed. The network centralization score ranged from 0 to 0.67. The mean was 0.27 and the median was 0.29. Unlike some service-delivery networks, these governance networks usually did not have a centralized organization that controlled key resources. Organizations were rather independent. A centralization score of 0 indicated that the network was completely decentralized, and 0.67 suggested a moderately high score of centralization. Network effectiveness ranged from 10 to 51.5 with a mean of 33.3. The absolute values of bivariate correlation coefficients ranged from 0.11 to 0.63, suggesting that variables were not highly correlated. Therefore, multicollinearity may be not a serious threat.

Linear Modeling

OLS regression was employed to tease out the true relationships between variables. The small sample size posed a number of problems for regression analysis. For example, the assumption of normality was not likely to hold, causing hypothesis tests of coefficients invalid. The bootstrap approach was employed to mitigate this problem. Bootstrap is a nonparametric approach to make statistical inferences, which does not require distributional assumptions. The basic idea is to resample the original data set with replacement for a very large number of times, and then to use the empirical sampling distribution to make inferences. In this research, I resampled 2,000 times with replacement from the original sample, which, according to Efron and Tibshirani (1993), can produce a "very safe" estimation of the true confidence intervals. Table 1 displays the test of statistical significance based on bootstrap standard errors. Model 1 tried to replicate the Provan-Milward model by using centralized integration as the structural variable. Network centralization was statistically significant at the 5% level; however, the sign was negative, suggesting that centralized networks were less effective, adjusting for the effects of other variables. This result contradicted the findings of other studies (Provan and Milward 1995, Raab, Mannak, and Cambré 2013, Jennings Jr and Ewalt 1998). Network stability was still significant and had a positive effect on network effectiveness. As the above discussion suggests, density-based integration is a different or even opposite logic compared with centralized integration. The effects of centralized integration and density-based integration may contradict each other (Provan and Milward

1995), so it would be interesting to see which mechanism is more favorable for network effectiveness. Model 2 replaced centralized integration with density-based integration. Network density turned out to be statistically significant at the 5% level. The positive sign suggested that networks with dense cooperative relationships tended to be more effective, controlling for other independent variables.

Table 1. Tests of statistical significance with bootstrap standard errors

Independent Variables	Model 1			Model 2		
	Coefficients	Bootstrap SE	Bootstrap 95% CI	Coefficients	Bootstrap SE	Bootstrap 95% CI
Neighborhood SES	0.19	0.14	[-0.09,0.45]	0.18	0.15	[-0.12,0.47]
Network stability	10.15**	4.30	[2.35,19.18]	3.18	4.48	[-6.68,11.92]
Resource munificence	0.29	12.43	[-31.30,19.57]	3.10	11.94	[-26.00,22.79]
Network density	---	---		22.00**	9.74	[3.68,42.10]
Network centralization	-18.46**	9.21	[-36.68,-0.23]	---	---	
Constant	24.61			6.93		
Number of observations	22			22		
Replications	2,000			2,000		
Adjusted-R squared	0.29			0.31		

Note: *** p<0.01 **p<0.05 * p<0.1

Analysis with the fsQCA method

The fsQCA analysis was employed for further analysis in order to better explore causal asymmetry, equifinality and complex interactions between independent variables. Raw data have to be calibrated in order to be analyzed by the fsQCA software. Technical details of the calibration process are provided in Appendix Three. The raw data were calibrated into set membership scores ranging from 0 to 1 with 0 representing full nonmembership and 1 representing full membership. Further analysis was based on the truth table approach. The analytical software, fsQCA 2.5, was used to do the analysis. Results are presented with the notation system developed by Ragin and Fiss (2008). A black circle (●) suggests a high membership score in a condition, and a circle with a cross-out (⨂) indicates a low membership score in a condition. A blank space suggested that this condition was irrelevant – the presence or absence of it did not make a difference in the outcome. Tables 2, 3 and 4 in Appendix Three show all the truth tables that were analyzed.

I first tried to reproduce the results of Provan and Milward's (1995) study with network centralization as the structural factor. Table 2 shows the two causal paths that were obtained. Only complex solutions are reported here, which is most conservative approach to dealing with logical remainders or theoretical configurations that do not have empirical cases. The logical remainders were considered as "false" and were not used to simplify configurations (Ragin 2008). One causal path was the combination of high membership scores in the sets of resource munificence and network stability, suggesting that stable networks with sufficient resources are very likely to be effective. Neighborhood SES and network density were irrelevant. 11 cases showed this configuration. The consistency score of this path was 0.80, suggesting that 80% of the cases with this configuration were effective. Its raw coverage was 0.57, meaning that this causal path can explain 57% of all the effective networks. Its unique coverage was 0.22, suggesting that 22% of the effective networks were uniquely explained by this causal path. The other causal path was the combination of high resource munificence, high neighborhood SES and low network centralization. Five cases demonstrated this configuration. 91% of the networks with this configuration were effective, and this configuration explained 62% of all effective networks with a unique coverage of 17%.

Interestingly, the evidence suggests that network centralization is unfavorable to network effectiveness, which, again, contradicts findings from other studies (Provan and Milward 1995, Raab, Mannak, and Cambré 2013). The overall solution coverage was 0.74, showing that these two paths could explain 74% of all the effective networks, and the solution consistency was 0.80, indicating that 80% of the networks with the two configurations were effective.

Table 2: Configurations leading to network effectiveness

configuration	solutions	
Resource munificence	●	●
Neighborhood SES	●	
Network centralization	⊗	
Network stability		●
Number of cases	11	5
Consistency	0.91	0.80
Raw coverage	0.62	0.57
Unique coverage	0.17	0.22
Overall Solution consistency	0.80	
Overall solution coverage	0.74	

Note: frequency cutoff=1, consistency cutoff=0.80

To test the impacts of network density on network effectiveness, I replaced network centralization with density and did the analysis again. Two causal recipes were returned, as Table 3 shows. The first causal path was the combination of resource munificence and network stability, which was also obtained in the above analysis. Its consistency and raw coverage were also the same as those of the previous analysis. 11 cases showed this causal path. The second path was the combination of resource munificence, network density and neighborhood SES. Network stability was irrelevant in this causal recipe. Six cases showed this causal path. The consistency score of this path was 0.92, suggesting that 92% of the cases with this combination were effective. This path could explain 47% of effective networks with a unique coverage of 9%.

Table 3: Configurations leading to network effectiveness

configuration	solutions	
Resource munificence	●	●
Neighborhood SES		●
Network density		●
Network stability	●	
Number of cases	11	6
Consistency	0.80	0.92
Raw coverage	0.57	0.47
Unique coverage	0.20	0.09
Overall Solution consistency	0.81	
Overall solution coverage	0.67	

Note: frequency cutoff=1, consistency cutoff=0.80

Unlike conventional regression analysis that assumes causal symmetry, the fsQCA method is built on causal asymmetry, which assumes that factors leading to the presence of an outcome may be different from factors leading to its absence (Fiss 2011, Ragin 2008). An analysis of configurations of factors leading to network ineffectiveness was thus conducted. As Table 4 shows, one configuration was obtained, which was the combination of low membership scores in three sets: network density, network stability and neighborhood SES.

Six cases demonstrated this causal path. If a network is unstable, lacks cooperation between organizations and has a low SES, then it is very likely to be ineffective. 82% of the networks with this configuration were ineffective, and this configuration alone could explain 50% of all ineffective networks.

Table 4: Configurations leading to network ineffectiveness

configuration	solutions
Resource munificence	
Neighborhood SES	⊗
Network density	⊗
Network stability	⊗
Number of cases	6
Consistency	0.82
Raw coverage	0.50
Unique coverage	0.50
Overall Solution consistency	0.82
Overall solution coverage	0.50

Note: Note: frequency cutoff=1, consistency cutoff=0.80

DISCUSSION AND CONCLUSION

The regression analyses and fsQCA analyses produced some interesting findings. Adjusting for the influence of other independent variables, the first regression analysis showed that network stability is positively related to effectiveness and network centralization is negatively related to effectiveness; the second regression analysis showed that network density is positively related to network effectiveness. The fsQCA analyses revealed two equifinal paths that lead to network effectiveness and one causal path that leads to network ineffectiveness. Each causal path is a configuration of factors that is difficult to capture with conventional linear models.

The first fsQCA analysis of network effectiveness revealed the interesting impact of network centralization on effectiveness. Low membership in the set of centralization combined with high membership in the sets of resource munificence and neighborhood SES lead to network effectiveness. In other words, a network is very likely to be effective if it has sufficient resources, high-SES and low centralization. This is consistent with the above regression analysis in that a lower level of network centralization is favorable for effectiveness, although the finding here is configurational in nature. Linear regression and the fsQCA analysis showed a similar effect of centralization on network effectiveness; combining the two perspectives thus complicates our understanding of the relationship. This finding, however, conflicts with other studies that suggested a positive relationship between centralization and effectiveness (Provan and Milward 1995, Raab, Mannak, and Cambré 2013, Jennings Jr and Ewalt 1998). According to these studies, central organizations can better coordinate other organizations to overcome fragmentation and increase efficiency.

The negative relationship between centralization and effectiveness found in this paper does not necessarily invalidate previous findings but calls for a reexamination of the relationship. The size of networks may be an important factor to moderate the relationship, as Provan and his colleagues suggested (Provan and Milward 1995, Provan and Kenis 2008, Provan and Sebastian 1998). An organization can handle only a limited number of links. In large networks, the quantity of relationships that each organization needs to manage may go beyond their limits, leading to chaos and ineffectiveness (Provan and Milward 1995). Under this circumstance, central organizations may help to solve the problem by coordinating other organizations and freeing others from managing relationships. In contrast, the governance networks under study are small, so organizations have little problem with handling all possible links. Direct coordination with other organizations may have the edge over centralized coordination. The reason is that, through intensive interactions, organizations become familiar with one another, develop trust, minimize opportunistic behaviors and reduce transaction costs (Raab, Mannak, and Cambré 2013, Provan and Sebastian 1998). This causal mechanism is consistent with, though not the completely the same as, one of the contingencies that Provan and Kenis (2008) proposed. They maintained that small networks can be effective if they also combine pervasive trust and a decentralized or shared governance structure in which all organizations participate in production processes on an equal basis.

The type of networks may also moderate the relationship between network integration and effectiveness. Previous studies (Provan and Milward 1995, Raab, Mannak, and Cambré 2013) focused mainly on networks with a core mission of providing certain services. In these networks, centralized integration might improve the efficiency of service provision. In contrast, networks in this research had missions of both decision making and implementation. Central organizations could not make all decisions or impose decisions to other organizations. Direct and decentralized interactions between organizations may help to improve the legitimacy of decision-making and the effectiveness of implementing decisions. Of course, this hypothesis should be further explored.

An important caveat is that centralization scores used in this paper were based on degree centrality, which measured the degree to which one or a few organizations have a lot of links with neighbors. This is different from centralization based on global measures such as betweenness centrality, which measures the degree that one or a few organizations in the network are on the shortest pathway between other pairs of actors. In small networks such as those under study, centralization based on degree centrality may well capture the global network characteristic because central organizations may be connected to all others. However, this may not be true in large networks. Whether different types of centralization scores may have different effects on network effectiveness needs to be further examined.

A common causal path identified by the two fsQCA analyses was the combination of network stability and resource munificence. With this configuration, neither density-based integration nor centralized integration was relevant. The result suggested that the combination of resource and stability can offset some negative effects of the lack of dense collaborative relationships. Wan-Quan was such a network with abundant financial resources and stable governance structure. Though homeowners once fought hard to establish an HOA, they were completely defeated. The developer and property management firm formed an alliance with the Street Office and controlled the neighborhood completely. Stability was achieved through domination in this case, and as a result, interorganizational trust was relatively low. However, the alliance pumped sufficient resources into the neighborhood. Though the network was at the low end of network density, it was still governed very well with a high membership score in effectiveness (0.95). Provan and Kenis (2008) argued that symmetric power relations are important for small networks to achieve effectiveness because they are the basis of shared governance and dense trust. This research suggests that small networks can still be effective even if power relations among organizations are asymmetric and little trust exists, as long as powerful organizations can provide necessary resources and maintain stability. Stability does not indicate consensus – it can be achieved by powerful organizations suppressing other organizations.

The second fsQCA analysis indicated that the combination of network density, resource munificence and neighborhood SES leads to effectiveness. Stability is not relevant if the other three conditions are present. The Atlantic neighborhood was such an unstable network in which homeowners were seeking to play a bigger role in governance. They were proposing to change to the existent governance structure at the time of study by firing the property management firm (PMF) and hiring a new one. The PMF refused to hand over their duties. The neighborhood was rich in financial resources (0.95), and had a high SES (0.85). It had considerably high network density because some members such as the HOA and government entities were still collaborating. Despite the uncertainties about the future of its governance structure, it was still quite high in effectiveness (0.84). With this configuration, networks can tolerate certain degrees of uncertainty and instability. It is thus a favorable condition for initiating changes or reforms in networks. However, this does not mean that tolerance is unlimited. It is very likely that, beyond a certain point, instability may reduce collaboration and decrease network density, leading networks away from effectiveness.

The path leading to network ineffectiveness was not a simple negation of any of the paths leading to network effectiveness. In contrast, it was a unique configuration of both structural and environmental factors. The combination of low stability, low network density and low neighborhood SES will lead a neighborhood governance network to be ineffective. Further analysis suggests that, with a consistency score of 0.96, this configuration is almost a necessary condition to network ineffectiveness. Resource munificence is irrelevant in this configuration, which suggests that, even if there are sufficient resources, the lack of collaboration and stability may prevent the network from making the best of the resources. The Hong-Yuan neighborhood was a case of ineffective network. Homeowners were very unsatisfied with the poor property management service, and were trying to organize themselves to fire the management firm. However, in a low SES neighborhood, they lacked the human and social capital to make their organizing efforts more effective. Activists gained little support from other homeowners and they could not put much pressure on the developer/property management firm. Little interorganizational collaboration existed in service provision. The neighborhood was governed rather terribly with a membership score of 0.98 in the set of poorly governed neighborhoods.

Structural characteristics and their impacts have long been the center of network research. Salancik (1995) argued that a good network theory should "propose how structures of interactions enable coordinated interaction to achieve collective and individual interests" (p.348). However, our fsQCA analyses suggest that network structures may not be as important as scholars have thought in influencing network effectiveness. Network structure, or specifically, network integration, is neither a necessary nor a sufficient condition for network effectiveness. Effectiveness can be achieved regardless of the condition of integration, provided that networks are stable and have sufficient resources. Even when integrated structure such as high density is present, it has to be combined with resource munificence and high neighborhood SES in order to achieve effectiveness. The analysis of configurations leading to ineffectiveness suggested that the lack of network density alone is not sufficient for ineffectiveness; it has to be combined with low stability and low SES in order to cause ineffectiveness. However, with a consistency score of 0.88, the lack of network density is almost a necessary condition for network ineffectiveness. The implication is that the lack of network integration may not automatically lead a network to be ineffective, but improving network integration may help to avoid network ineffectiveness. Of course, this will not make the networks effective, which needs different configurations of factors.

The fsQCA analysis showed that resource munificence appeared in all four paths leading to effectiveness. A test of necessary condition was conducted using the fsQCA software. A necessary consistency score of 0.80 was obtained, which, according to Ragin (2000), suggested that this condition is "almost always necessary." This is consistent with previous findings (Provan and Milward 1995, Conrad et al. 2003). Provan and Milward (1995) maintained that network effectiveness ranges from low to high in a resource-rich environment and ranges from low to moderate in a resource-scarce environment, depending on other network characteristics. Thanks to the fsQCA method, we were able to identify the factors such as system stability that combine with resource munificence to affect network effectiveness. The interview record suggested that resource munificence was critical to keep networks working; it became a key constraint in two cases: Yi-Mei and Shang-Di. Both networks had impressive effectiveness scores (0.89 and 0.91), but interviewees suggested that the lack of sufficient resources was the major obstacle for them to achieve a higher level of effectiveness. For example, some facilities were not maintained as well as residents expected due to resource constraints.

This paper contributes to the current literature in several ways. One major contribution is that, following the work of Raab, Mannak, and Cambré (2013) and Verweij et al. (2013), this study continued to use the QCA method to develop configurational theories of network effectiveness. The fsQCA analyses greatly deepen our understanding of the causal complexities of network effectiveness. First, the paper revealed the complex interactions between four causal conditions that are difficult for conventional regression analysis to capture. Second, this research found equifinal causal paths to network effectiveness. Unlike conventional regression analysis that aims to find a unifinal solution, the fsQCA method reveals functionally equivalent causal paths to network effectiveness. Third, the analysis also showed that causality was asymmetrical: factors leading to network effectiveness were different from factors leading to ineffectiveness, which gave us a better idea of what may cause ineffectiveness.

This paper also complicates our understanding of the effects of structural characteristics on network effectiveness. The analyses demonstrated that centralization may be unfavorable for effectiveness, and density-based integration is positively related to network effectiveness. Network size may have a role to play here, and this conclusion may hold in small networks. Network structure is neither a sufficient nor a necessary condition for network effectiveness.

Last but not least, the findings of this paper also carry practical implications. The identified causal recipes that lead to network effectiveness and ineffectiveness can be used to make more discriminating diagnoses of networks. The findings may help managers and policy makers to gain a more fine-grained understanding of how factors interact with each other, and thus design networks in an effective way or change current networks in order to achieve effectiveness. The equifinal causal paths to network effectiveness are especially helpful. Since there are several functionally equivalent paths to network effectiveness, managers can select the one that incurs the least cost or the one that is more compatible with their environments.

When it comes to implications to neighborhood governance in urban China, special attention needs to be placed on network density and network stability. Compared with neighborhood SES and resource munificence that are generally fixed in the short run, network density and stability can be improved within a relatively short period, though not without difficulties. In many neighborhoods that are poorly governed, conflicts and fights between organizations cause instability and impede collaboration. Neighborhood organizations need to work out a compromise regarding respective roles and responsibilities, which may serve as a basis for trust building and collaboration. Of course, in many neighborhoods, conflicts are so severe that it is almost impossible for these organizations to reach any compromises. Under this circumstance, it is imperative for higher-level governments or the designers of the Housing Reform to take measures such as mediating or arbitrating conflicts on a case-by-case basis in order to overcome the barriers to collaboration and to achieve stability.

This paper also has several limitations. One limitation is the approach to operationalizing and measuring network effectiveness. This paper selected the priorities of one specific constituency group, homeowners, as the criteria for measuring effectiveness. The reason was that homeowners were both property owners and the most important consumers. As the above discussion indicated, this was a normative decision. The priorities of other constituency groups such as street-level governments may also need to be considered in some form. Multiple approaches and criteria can be used to measure different dimensions of effectiveness and each approach has its strengths and limitations (Bommer et al. 1995). The approach adopted by this paper is just one of the many possible approaches and it is certainly not perfect. Another limitation is that the paper does not formally test the effects of network size on network effectiveness, although the theoretical role of network size is highlighted. The reason is that the sizes of networks under study were small and varied too little for the fsQCA analysis. Future research may test the moderating effect of network size with networks that have considerable variation in sizes. A last limitation is that this paper investigates a particular type of network – governance networks – that combine decision making and service delivery. Governance networks have their own unique internal dynamics and thus are not completely the same as service-delivery networks. Caution is needed when generalizing the conclusions to other types of networks.

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Appendix One

In order to overcome the limitations of subjective and objective measures, an integrated measure of effectiveness was constructed. HOA leaders subjectively evaluated the conditions of sanitation, facility maintenance and safety; two independent evaluators evaluated the conditions of sanitation and facility maintenance based on photographic evidence. Since safety can hardly be captured by photos, the external evaluation of safety came from my personal observation and the experience of entering each neighborhood in my fieldwork. This was a multitrait-multimethod approach to measure effectiveness and it raised questions of construct validity and reliability.

Campbell and Fiske's (1959) correlational approach was employed to check the validity of the integrated measure. To establish convergent reliability, the correlation coefficients of the same trait measured by different methods should be statistically significant and sufficiently large (Campbell and Fiske 1959). As Table One in Appendix One showed, the correlation coefficients between three evaluations of sanitation were 0.896, 0.612 and 0.580, and all of them were significant at the 5% level. The coefficients involved subjective ratings (0.612 and 0.580) were smaller than the one between two independent coders. The correlation coefficients between evaluations of facility maintenance were 0.966, 0.445 and 0.476, and all of them were significant at the 5% level. Similarly, the two correlation coefficients between subjective and external evaluations were lower. The correlation coefficient between external and subjective evaluations of safety was 0.433 and it was also significant at the 5% level. These coefficients were comparable to, if not higher than, the correlation coefficients found in the current literature. The meta-analysis of Bommer et al. (1995) showed that the corrected mean correlation between subjective and objective measures in his sample of 50 published papers was only 0.389, and similarly Heneman (1986) reported a corrected mean correlation of 0.27 in his meta-analysis. A number of other studies found similar ranges from 0.4 to 0.7 (Dawes 1999, Wall et al. 2004). This range of correlation coefficients was considered as having convergent validity in the literature (Wall et al. 2004). Therefore, the moderately high correlations were not a serious threat to the convergent validity of the integrated measure.

The reliability of measures also needs to be considered. Since this was a multitrait-multimethod approach to measure effectiveness, internal consistency reliability of different traits measured with the same method and inter-rater reliability (inter-method reliability in this research) should be checked. "Effectiveness" was operationalized with three dimensions, so Cronbach's alphas were calculated to check whether the three items were consistently measuring the same underlying construct. The results were shown in the Table One in Appendix One. The three Cronbach's alphas ranged from 0.79 to 0.93, indicating good reliability. Intraclass correlation coefficients (ICC) were calculated to test whether external and subjective evaluations converged with one another. The ICC of three measures of sanitation was 0.87, and the ICC of three measures of facility maintenance was 0.83. The above two indicated very good inter-method reliability. The ICC of subjective and external evaluations of safety was 0.61, which was lower than a satisfactory one.

The relatively low consistency between subjective and external evaluations of safety merited special attention. The discrepancy might come from two sources: subjective bias or gloss external evaluation that did not capture the actual situation. To test the quality of external evaluation of safety, I checked the Cronbach's alpha between the external evaluation of safety and the two external evaluations of sanitation and facility maintenance to see how consistent they were. The results were 0.884 and 0.859, suggesting a very good internal consistency. The result showed that they were measuring the different dimensions of "effectiveness". I also checked the ICC between external evaluation of safety and external evaluations of sanitation and facility maintenance to check the inter-coder reliability. The results were 0.880 and 0.853, which again, showed good reliability. We can conclude from the evidence that the external evaluation of safety was consistent with external evaluations of sanitation and facility maintenance, though they were conducted by different evaluators. The quality of this evaluation was as good as the other external evaluations. Therefore, I would argue that the discrepancy in the evaluation of safety was more likely to be caused by reporters' subjective bias. Safety is so important that any report of crime may cause great psychological impacts on people. As the criminal justice literature suggests, subjective measures of crime are prone to a number of bias, such as recency bias, intensity bias, income bias, and people tend to overestimate the number and intensity of crimes (Jahedi and Méndez 2014, Lewis and Maxfield 1980). Given the limitations of subjective evaluation of safety, I would argue that this discrepancy is not a serious threat to the reliability of the measures.

Table 1. Multitrait – multimethod correlation matrix

	External 1		**External 2**			**Subjective**		
	X1	X2	X1	X2	X3	X1	X2	X3
External 1								
Sanitation(X1)	1							
Maintenance (X2)	0.836							
External 2								
Sanitation(X1)	(0.896)	0.849	1					
Maintenance (X2)	0.847	(0.966)	0.867	1				
Safety (X3)	0.558	0.617	0.677	0.606	1			
Subjective								
Sanitation(X1)	(0.612)	0.458	(0.580)	0.520	0.477	1		
Maintenance (X2)	0.446	(0.445)	0.523	(0.476)	0.359^{ns}	0.684	1	
Safety (X3)	0.532	0.289^{ns}	0.555	0.374^{ns}	(0.433)	0.601	0.430	1
Cronbach's α	0.91		0.93				0.79	
ICC	All X1: 0.87		All X2:0.84		X3: 0.61			

Note: "ns" denotes the coefficient is NOT statistically significant at the 5% level.
ICC=Intraclass correlation coefficient
Correlation coefficients of interests are in parentheses.

Appendix Two

Table 1 Summary Statistics

	Mean	Median	Min	Max
Effectiveness	33.3	35.5	10	51.5
Neighborhood SES (in thousands RMB)	44.3	46.5	10	79.8
Network Stability	0.5	0.5	0	1
Resource Munificence	0.80	0.89	0.3	1
Density	0.65	0.59	0.4	1
Centralization	0.27	0.29	0	0.67

Table 2. Network density and centralization

name	network density	network centralization
Wan_Quan	0.50	0.33
Fei_Cui	0.40	0.17
Feng_Dan_Li_She	0.58	0.67
Mei_li_Yuan	1.00	0.00
Guan_Hu Inter	1.00	0.00
Guan_Zhu	0.67	0.67
LI_Du	0.47	0.20
Jiang_Xiang	0.60	0.25
Atlantic	0.83	0.33
Yue_Yuan	0.83	0.33
Wang_Fu	0.50	0.33
Shang_Di	1.00	0.00
YI_Mei	0.70	0.50
Tian_Tian	1.00	0.00
Rong_Feng	0.47	0.20
Chao_Yang	0.75	0.33
Hong-Yuan	0.50	0.33
Bai_Zi	0.50	0.33
Yi_Shui	0.40	0.17
Rui_Du	0.40	0.17
Peng_Lai	0.50	0.33
Dong_Mao	0.60	0.25

Table 3. Correlation Coefficients between Variables

	Effectiveness	Neighborhood SES	Network Stability	Resource Munificence	Density	Centralization
Effectiveness	1					
Neighborhood SES (in thousands RMB)	0.41	1				
Network Stability	0.52	0.32	1			
Resource Munificence	0.33	0.35	0.42	1		
Density	0.55	0.13	0.63	0.27	1	
Centralization	-0.22	0.11	0.11	-0.13	-0.36	1

Appendix Three

Calibration

Raw data have to be calibrated in order to be analyzed by the fsQCA software. Calibrated measures not only order cases relative to each other but also peg measures to external criteria. Calibrated measures are thus directly interpretable, showing qualitative degrees in the underlying construct. The raw data were calibrated into set membership scores ranging from 0 to 1 with 0 representing full nonmembership and 1 representing full membership.

Ragin (2008) argued that calibration should be conducted on the basis of researchers' substantive and theoretical knowledge, but when theoretical knowledge are not available, calibration should be based mainly on substantive knowledge. Direct method of calibration was employed in this research. Three important anchors structure the calibration process: the threshold for full membership in a set, the threshold for full nonmembership, and the crossover point. The crossover point is the point where there is maximum ambiguity as to whether a case is more in or more out of the set (Ragin 2008).

Network effectiveness The scores of network effectiveness ranged from 0 to 56. There are hardly any theories that set specific criteria of network effectiveness, so the calibration was mainly based on substantive knowledge of each neighborhood governance network. The threshold of full membership of effective network was set at 44. Only three neighborhoods had effectiveness scores higher than 44, which were governed significantly better than the rest. The crossover point was set at 33 (45 percentile). The neighborhood with this score was the one that was the most difficult to judge whether it was effective or not. The full nonmembership was set at 25 (about 27 percentile). Neighborhoods with scores less than this point were clearly poorly governed.

Resource munificence Resource munificence was measured by **the percentage** that financial resources could cover the cost of service provision. The threshold of full membership in resource munificence was set at 100%, and actually 10 neighborhoods had this value. In these neighborhoods, there were sufficient resources for member organizations to provide services and to engage in related activities. The crossover point was set at 65%, which was the point of maximum ambiguity. For example, Yi-Mei neighborhood had this level of resource munificence. The resources enabled organizations to provide services at a very basic level and were not enough to meet all of homeowners' expectations. The full nonmembership point was set at 40% (about 14 percentile). Two neighborhoods had this value and my clear perception during my fieldwork was that these two neighborhoods did not have the basic level of resources to provide services. The neighborhoods were very poorly maintained mainly due to resource constraints.

Network density Density is the number of links in a network reported as a fraction of the total links possible. In this paper, the full membership threshold for dense network was set at 1, which means that all possible links existed in these networks. This score shows very high density and it is rare in reality (Scott 2012). Four neighborhood networks had this density score, which was mainly due to the small sizes of these networks. The crossover point was set at 0.65 (about 60 percentile). About two thirds of all possible links existed, and it was really hard to tell whether they were densely connected or not compared with other networks. The full nonmembership point was set at 0.4 (about 14 percentile). Three networks had density scores smaller than this one, and my field observation was that organizations in these networks were quite independent of one another. Little meaningful collaboration existed.

Network centralization Centralization measures the degree to which a network's ties are focused on one organization. When calculating centralization scores, we need to look at the differences between the centrality score of the most central point and those of other points (Scott 2012). Centralization score was calculated by dividing the actual sum of differences by the maximum possible sums of differences. The most centralized network, which has the centralization score of 1, is a star-shaped network with all peripheral nodes linking only to the central node (Scott 2012) . These star-shaped networks are actually rare in reality. In this research, the full membership threshold of centralized network was set at 0.6, which is a fairly high centralization score. The crossover point was set at 0.32 (around 50 percentile), which was the point of maximum ambiguity with regard to centralization. The full nonmembership point was set at 0.1 (22 percentile). Four neighborhoods were completely decentralized with a centralization score of 0.

Neighborhood SES. Neighborhood SES was measured by housing price – the price per square meter in recent apartment sales. The average housing price in Beijing at the time of my fieldwork at the end of 2012 was 28,000 RMB (approximately $4,500) per square meter. The full membership threshold of high SES neighborhood was set at 60,000 RMB (86 percentile), which was more than two times of the average price in Beijing. Neighborhoods with housing price above this level included high-end apartment neighborhoods and townhouse neighborhoods. The full nonmembership threshold was set at 20,000 RMB (13 percentile), which was lower than the average price in Beijing. Neighborhoods with housing price lower than this level were usually at the peripheral part of the city. People living in these neighborhoods usually came from low-SES background: they were farmers who lost their land in commercial development processes, retired workers or people migrated from other places to work in Beijing. The crossover point was set at 29,000 (45 percentile), which was slightly higher than the city average price.

Network stability was a dichotomous variable, so it did not need to be calibrated. It was a binary variable with 1 representing the fact that some members were proposing or facilitating changes to the distribution of resources and 0 otherwise. The changes are very likely to threaten the interests of some network members and create conflicts. The information was gained from in-depth interviews.

Robustness Check

To check the robustness of the key findings, I conducted several robustness checks. First, I checked whether the findings were robust to alternative specifications of the thresholds of calibration. Following the practice of Fiss (2011), I specified two new crossover points for each of the causal conditions except network stability which was a dichotomous condition. The magnitude of change was within 33%, and the magnitude, which was different for different conditions, was mainly based on substantive knowledge. The reason to change crossover point was that it is the point of maximum ambiguity with regard to whether it is in or out of the set. In contrast, the thresholds for full membership and full nonmembership are two extreme points that have relatively little ambiguity. Then, I compared the new intermediate solutions with the original one. The results are reported in the following table. The results were generally robust to different specifications of the crossover points. The only exception was that a new causal path emerged when the crossover point of resource munificence was changed from 65% to 75%. The new path was the combination of high density and high stability. However, when I looked the cases again, 65% was the crossover point that made more sense to me. It was the point where neighborhood organizations had a hard time balancing their priorities. Neighborhoods in which the revenues could cover 75% of the costs were in a much better condition of resource munificence.

Table 1. Results of robustness checks

Causal condition	Original crossover point	Round 1			Round 2		
		Crossover point	Changes in causal paths	Biggest changes in consistency or coverage	Crossover point	Changes in causal paths	Biggest changes in consistency or coverage
Network centralization	0.32	0.36	No	2%	0.42	No	10%
Network Density	0.65	0.60	No	1%	0.55	No	2%
Resource Munificence	65%	60%	No	3%	75%	Yes	8%
Neighborhood SES	29,000	36,000	No	1%	39,000	No	1%

I then changed the consistency cutoff point from 0.80 to 0.85, and the resulted causal paths were the same as the reported ones. However, different patterns emerged when the consistency cutoff was set at 0.90. For example, in the analysis of network effectiveness with centralization as the structural characteristic, the causal path of low centralization, high SES and high resource munificence stayed the same, but the other causal path changed to high resource, high stability and low SES. When the consistency cutoff was set at 0.95, completely different causal paths emerged in the analyses. However, 0.9 is a high requirement for consistency and may reduce the number of meaningful cases in analyses in a small-N study like this one. A consistency level of 0.80 or 0.85 is above the minimum recommended level of 0.75, and has also been widely used in published papers (Fiss 2011, Stockemer 2013, Verweij et al. 2013). Therefore, I decided to accept the configurations reported in the paper.

Table 2. Truth table for the analysis of network effectiveness
(with centralization as the structural condition)

Conditions				Outcome (effectiveness)	Number of cases	consistency
stability	centralization	Resource munificence	Neighborhood SES			
1	0	1	1	1	3	1.00
1	0	1	0	1	1	0.94
1	1	1	0	1	3	0.90
1	1	1	1	1	4	0.84
0	0	1	1	1	2	0.81
0	1	1	1	0	1	0.73
0	0	0	1	0	1	0.60
0	0	0	0	0	1	0.49
0	1	0	1	0	1	0.35
0	1	0	0	0	2	0.32
0	0	1	0	0	3	0.32

Table 3. Truth table for the analysis of network effectiveness
(with density as the structural condition)

Conditions				Outcome (effectiveness)	Number of cases	consistency
stability	density	Resource munificence	Neighborhood SES			
1	1	1	0	1	3	1.00
1	1	1	1	1	5	0.93
0	1	1	1	1	1	0.90
1	0	1	1	1	2	0.90
1	0	1	0	1	1	0.87
0	0	1	1	0	2	0.73
0	0	0	1	0	2	0.53
0	0	0	0	0	3	0.37
0	0	1	0	0	3	0.31

Table 4. Truth table for the analysis of network ineffectiveness
(with density as the structural condition)

Conditions				Outcome (Ineffectiveness)	Number of cases	consistency
stability	density	Resource munificence	Neighborhood SES			
0	1	0	0	1	3	0.91
0	0	0	0	1	3	0.87
0	0	0	1	0	2	0.64
0	0	1	1	0	2	0.58
1	0	1	0	0	1	0.58
0	1	1	1	0	1	0.51
1	1	1	0	0	3	0.40
1	0	1	1	0	2	0.40
1	1	1	1	0	5	0.33