

**Provan and Milward 1995 Revisited:
A Case-Study on Network Structure and Network Effectiveness
of a Dutch Mental Health Care Network**

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Marion Vollenberg
Faculty of Social and Behavioral Sciences
Department Organisation Studies / Tranzo
P.O. Box 90153
5000 LE Tilburg, The Netherlands
E-mail: m.m.vollenberg@uvt.nl
Phone: +31 13 4663476

Joerg Raab
Faculty of Social and Behavioral Sciences
Department of Organisation Studies
P.O. Box 90153
5000 LE Tilburg, The Netherlands
E-mail: j.raab@uvt.nl
Phone: +31 13 4663651

Patrick Kenis
Faculty of Social and Behavioral Sciences
Department of Organisation Studies / Tranzo
P.O. Box 90153
5000 LE Tilburg, The Netherlands
E-mail: p.kenis@uvt.nl
Phone: +31 13 4663159

Summary

Despite frequent claims in the public management literature about the functionality and effectiveness of inter-organizational networks, we still have relatively little empirical evidence to substantiate these claims. In the paper, we argue that the slow progress in developing a network theory of effectiveness is due to several methodological and practical problems that are inherent in empirical research on the effectiveness of whole networks. We therefore propose and evaluate a strategy to conduct single or comparative case studies as replications of already existing studies that generally enjoy a high reputation. In the area of network effectiveness, the seminal study by Provan and Milward (1995) is up to this day one of the few studies that explicitly attempts to link structural characteristics of networks to their effectiveness. In order to broaden the empirical basis in this field and increase the external validity of Provan and Milward's findings this paper replicates their study and test the original four propositions at a different time and in a different institutional context (1995/2007, U.S. vs. Netherlands). We hereby intent to contribute to the further development of a inter-organizational network theory of effectiveness.

Provan and Milward's findings suggest that an integrated structure through network centralization and direct mechanisms of external control have a positive effect on network effectiveness. Furthermore, they suggest that system stability and resource munificence have a moderating effect. Consequently, the research questions are: First, what is the influence of network structure (level of integration and extent of external control) and network context (resource munificence and system stability) in mental health care networks on network effectiveness? Second, to what extent can the replication of reputable studies with single or comparative case studies contribute to an accumulation of knowledge across studies over time?

Data collection for the additional case took place from April to June 2007. We then transformed the quantitative scores of all five studies into relative qualitative outcomes. The independent variables were measured using a translated version of the original questionnaire by Provan and Milward (1995). The dependent variable 'effectiveness' was measured using a self-constructed questionnaire with items from validated questionnaires based on the similar theoretical concept as Provan and Milward (1995) namely clients' 'quality of life' (General Health Questionnaire [GHQ 30, Goldberg, 1972]. The results show that the main findings by Provan and Milward, namely the positive influence of centralized integration and non-fragmented external control on effectiveness were confirmed. We conclude the paper with some general thoughts on testing propositions and replicating studies in research on the effectiveness of inter-organizational networks.

1. Introduction

Inter-organizational networks are the hope of many scholars and practitioners in the field for solving the complex problems that occur in today's society. In the area of health and human services, the attractiveness of networks is the result of the logic behind cooperation between organizations, namely that by working together the health and well-being of community members will be improved (Provan, Veazie, Staten & Teufel-Shone, 2005). Hence, the popularity of inter-organizational networks is a result of the positive expectations about network outcomes.

Unfortunately there is still very little research conducted regarding the effectiveness of networks in general or in terms of population or client outcomes (Kreuter, Lezin & Young, 2000; Lehman, Postrado, Roth, McNary & Goldman, 1994; Provan & Milward, 1995; 2001, Provan & Sebastian, 1998; Provan & Kenis, 2005; Provan et al., 2005; Roussos & Fawcett, 2000). Since the rise of the network paradigm in the 1980s, research has mainly focussed on the determinants of network formation (e.g. Gulati & Singh, 1998, Oliver, 1990) and the structural aspects of networks (e.g. Garton, Haythornthwaite & Wellman, 1997; Wasserman & Faust, 1994). Empirical research that connects relational variables to network-outcomes is, however, hard to find (Provan & Milward, 1995). The few scientific studies done in this area are mostly concerned with the outcomes on the organizational and not the network level (Provan & Milward, 1995; 2001; Brass, Galaskiewicz, Greve & Tsai, 2004). In a recent review of the empirical literature Provan, Fish & Sydow (2007) only found 25 studies on whole networks in a twenty year time period (1985-2005). As a result, it remains unclear if the wide-spread assumption regarding the positive outcomes of inter-organizational networks is justified. However, one can assume that networks can produce both positive and negative outcomes depending on how they are structured or organized (Raab & Milward, 2003).

The reason for this modest progress is threefold (see also Provan, Fish & Sydow, 2007). First, studying network effectiveness implies that the level of analysis is the whole network. As a consequence, the researcher has to collect not only detailed outcome data but also relational data on all organizations involved which is a costly, tiresome and often also risky endeavor. This makes large n studies a very difficult project given the usual extent of research funds and time available. Second, in evaluating the effectiveness of a social entity, researchers have to define norms or criteria. As the name implies, these criteria are inherently normative and cannot be derived in a scientific process. As Simon (1976) has put it, effectiveness criteria are an “element of value” in contrary to “elements of fact” and therefore always subject to normative discussions. This fact may make some researchers hesitant to engage in research on network effectiveness in general. Some prominent scholars in the field of organizations studies have even come to the conclusion to abandon research on effectiveness altogether (Hannan and Freeman, 1977).

Third, if researchers engage in the study of network effectiveness they almost always choose their own empirical field, research design, set of independent variables as well as criteria and indicators to determine effectiveness. Given the nature of effectiveness criteria, there are no methodological or theoretical reasons why certain criteria or levels of analysis (Provan and Milward 2001) are superior compared to others as long as the criteria are well defined and specified as well as meaningful to the network under study (Provan and Kenis 2006). It is therefore no surprise that criteria in studies on the effectiveness of networks differ, because scholars tend to use the criteria they themselves deem most appropriate. These characteristics of research on network effectiveness make it very hard to compare the outcomes and successfully accumulate knowledge over time across different studies.

Despite this rather discouraging situation we still maintain that given the extraordinary importance of inter-organizational network effectiveness for the provision of public services

we need to make progress in better understanding under which conditions they perform well. i.e. are effective, and under which conditions they are likely to fail.

The question therefore arises, what solutions we can develop in this situation in order to nonetheless make progress in developing a network theory of effectiveness. The solution we would like to present and assess in this paper is to replicate accepted and exemplary studies and test the propositions put forward in single or comparative cases studies thus slowly enlarging the number of cases and gaining more specific insight in the theoretical mechanisms over time.

The most prominent study addressing the relation between structural characteristics of inter-organizational networks and their effectiveness has been conducted by Provan and Milward in the early 1990s and was published in *Administrative Science Quarterly* in 1995.¹ They studied the relation between network structure measured by network integration and external control and network effectiveness, of four mental health care networks in the US, operationalized as client well-being. The results show that networks do not produce positive or negative outcomes by default, but that network effectiveness depends on the way the networks are structured.

The research questions that guide our study therefore are: *First, what is the influence of network structure (level of integration and extent of external control) and network context (resource munificence and system stability) in mental health care networks on network effectiveness? Second, to what extent can the replication of reputable studies with single or comparative case studies contribute to an accumulation of knowledge across studies over time?*

¹ The study has by now been cited 159 times in ISI journals and is according to this criterion one of the most prominent studies in the area of interorganizational networks in general.

2. The additional case: “Bemoeizorg’-network² in the Helmond region (Netherlands)

At the start of this study the first concern was to find a network that was as similar as possible to the 1995 networks of Provan and Milward. The criteria for selection were based on the cases as studied by Provan and Milward in 1995. Consequently, the networks should:

1. be inter-organizational network (organizations as nodes);
2. incorporate at least one mental health care organization;
3. serve a client population that consists of adult clients with severe mental illnesses that are not admitted in a clinical setting. Consequently, networks that serve the young or elderly were excluded;
4. serve a client population of adult clients with a broad range of psychiatric illnesses. Consequently, networks that serve clients with a specific disease were excluded.

The case ultimately selected for this study is an inter-organizational network in the region Helmond in the Netherlands which provides services for clients with a severe mental illness, who are not yet registered as clients. In several cases the severe mental illness is combined with addiction problems. It concerns clients who have severe problems, from a client and/or a community perspective, and an urgent need for support. The main aim of the network is to seek, identify and provide (often unsolicited) support with the goal to improve the quality of life of the clients. Specific goals are: identifying and contacting the target population; improving or sustaining the quality of life of the client and the direct environment; reducing nuisance for the direct environment; enhancing the ability to support the personal network of the client; advancing the coordination of care and services provided to the client by different organizations in order to improve continuity of care; monitoring the client and, if possible,

² Bemoeizorg is a typical Dutch expression that is difficult to translate into English but it can be circumscribed as actively providing help to clients with severe mental illnesses who are not yet in contact with the healthcare system but are in urgent need of support from a client and/or community perspective. It provides (often unsolicited) support to these clients.

realize regular care-support. The core team consists of case managers of two organizations: GGZ Oost-Brabant/Helmond, a mental health care organization in the south of the Netherlands and Novadic-Kentron, the regional addiction centre.

This so-called 'Bemoeizorg'-network is operational since 1996 and is meant to endure as long as there is a client population to serve. Civilians, general practitioners, and organizations can refer clients to the network. These referrals are screened to see if the person in question is indicated to receive services of this specific network. The criteria for indication are:

1. the client suffers from a severe mental illness whether or not combined with addiction problems;
2. there is a situation of nuisance and/or neglect;
3. there is a lack of provision of care or services in the sense of a treatment relation (including a crisiscare-contract);
4. there is no severe threat or danger for the case managers.

In 2006, 161 clients were referred to the network in Helmond. Most of the referrals were presented by: regional police departments, housing associations, regional addiction centre Novadic-Kentron, social work, other departments of the mental health care organization, general practitioners, family members and social shelters. In 2007, five case managers (three of the mental health care institution GGZ Helmond and two of the addiction centre Novadic-Kentron) had (more or less) active contact with 71 clients. With regard to the boundary specification of the network, the last mentioned 71 clients were selected. With regard to the organizations that were a network member, the boundaries were specified using the positional approach of Laumann, Marsden and Prensky (1982) as did Provan and Milward in 1995. The only criterion was that the organizations should provide services to the client population of the network. A staff member mentioned several organizations and possible respondents

(organizational members that had a good overview of the network activities of their organization and their position in the network). This list of organizations and respondents was checked and completed by the network manager. All organizations mentioned were contacted by phone to make sure they provided services to the client population and to check the names of the respondents. This resulted in 13 organizations: the 'bemoeizorg' team; one mental healthcare institution; one addition centre; one organization for welfare work; one social shelter; three housing corporations; the local police department; one after-care and resettlement organization; one municipality (social services); MEE foundation and foundation ORO (for intellectually disabled) in combination with the social educational organization (SPD) (see list of all 13 organizations in table 10).

3. Testing the preliminary theory of inter-organizational network effectiveness

3.1 The original theoretical model

In their 1995 study, Provan and Milward conducted inductive research on four inter-organizational networks of mental health delivery in the four U.S. cities Tucson, Akron, Providence and Albuquerque. Network size, i.e. the number of organizations involved, ranged from 32 to 36, thus the networks being roughly of the same size. Quantitative and qualitative data was collected on numerous aspects of the organizations and the networks such as number of clients, budgets, various types of ties between the organizations and system stability. Moreover, the authors collected extensive data on random samples of severely mentally ill clients about their well-being and quality of life from a client, case manager and family perspective. Based on this data they developed the following preliminary model of network effectiveness and summarized their findings in four propositions to guide further research.

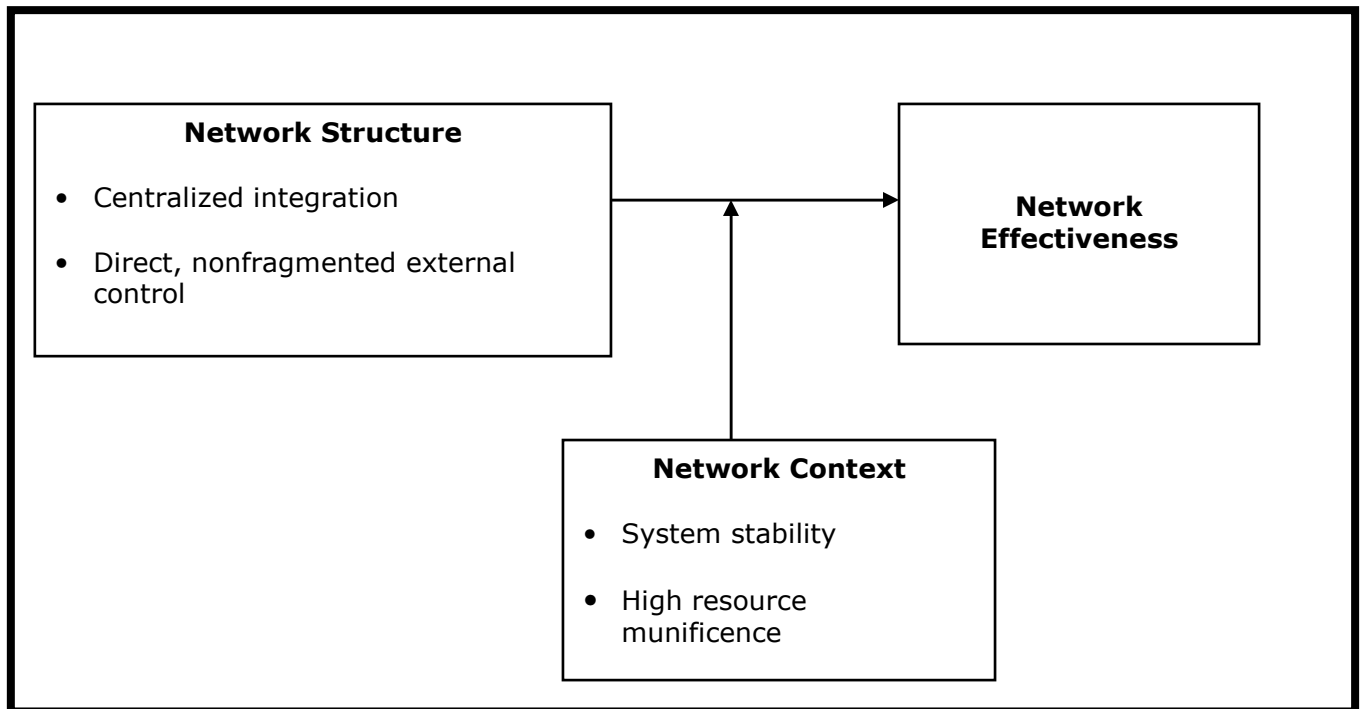


Figure 1: A preliminary model of network effectiveness (Provan & Milward, 1995, p. 24)

The propositions focus on the one hand on the importance of structural network factors like different forms of integration as well as network centralization but on the other hand emphasize the salience of system stability and resources as moderating variables. Moreover, the second independent variable is constituted by type and intensity of external control. The four propositions read as follows:

Proposition 1: “Other things being equal, network effectiveness will be enhanced when the network is integrated, but only when integration is achieved through centralization of the network. Networks that are both centrally integrated, through a core agency, and decentrally integrated, through cohesive links among network members, will be less effective than networks that are predominately centralized” (Provan & Milward, 1995, p. 25).

Proposition 2: “Other things being equal, network effectiveness will be highest when mechanisms of external control are direct and not fragmented. Low network

effectiveness will result when external control is indirect and when strong local mechanisms for monitoring and control are absent” (Provan & Milward, 1995, p. 25).

Proposition 3: “Other things being equal, network effectiveness will be enhanced under conditions of general system stability, although stability alone is not a sufficient condition for effectiveness. Networks that have recently undergone substantial change will be significantly less effective than stable ones. The impact of stability on network effectiveness will be greater to the extent that the clients of the network are themselves adversely affected by instability and uncertainty” (Provan & Milward, 1995, p. 26).

Proposition 4: “When a network is embedded in a resource-scarce environment, network effectiveness will range from low to moderate, depending on other network/system characteristics. When a network is embedded in a resource-rich environment, network effectiveness will range from low to high, depending on other network/system characteristics” (Provan & Milward, 1995, p. 27).

3.2 Data and measurement with regard to the Helmond network

Data collection took place from April to June 2007. We used the questionnaire by Provan and Milward after a forward-backward translation procedure and adaptation to the Dutch institutional context to measure network structure in terms of network integration (density, centralization and concentration of influence) and external control. In order to be applicable in the Netherlands the questionnaire underwent a forward-backward translation procedure and adaptation to the Dutch institutional context. After the respondents were contacted by phone to ask their cooperation, the questionnaire was sent out by e-mail with a letter which included

instructions and contact information. System stability, operationalised as major institutional changes, was measured using qualitative information collected by follow-up interviews which took place with all respondents after the questionnaire was returned. Resource munificence was calculated by using the per capita mental health care spending in the Netherlands in 2006 comparable to Provan and Milward in 1995. The response rate for the organizational questionnaire was 100%.

After that, follow-up interviews were carried out to collect additional qualitative information that resulted in the answers on the questionnaire, retrieve missing data and collect information with regard to the context variable system stability.

Network effectiveness was measured using a multi-perspective approach (clients as well as their case managers filled in a questionnaire). This questionnaire was based on the same theoretical concepts as Provan and Milward used in 1995 (quality of life and responsiveness). However, the institutional context as well as the network goal were not consistent with the concept of responsiveness, therefore the indicators that followed from this concept were excluded and the Golberg GHQ-30 questionnaire (1972) was used for the concept quality of life. After a forward-backward translation procedure the questionnaire was given to the case managers who also received the questionnaire for the clients. Response rate for the questionnaire on client well being (network effectiveness) was 33.8% (24 case managers and 24 clients filled in a complete questionnaire).

4. Results

4.1 Effectiveness

The ANOVA analysis showed that there was no significant difference between the client and the case managers perspective, in contrast to the 1995 Provan and Milward study. Therefore, principal component analysis could be and was carried out on both perspectives combined

(N=48). After a KMO and Bartlett's test the PCA showed that there was only one factor (Quality of Life) which made rotation redundant. The total variance explained by this one factor was 50% and Cronbach's alpha reliability was 0.965.

Factor scores were separately calculated for the client perspective and the case managers perspective (N=24) in order to make comparison with the Provan and Milward scores possible (see tables 1 and 2).

Perspectives	Network Helmond (N=24)
Client assessment (factor-score)	-.082
Case manager assessment (factor-score)	.082

Table 1: Factor scores on network effectiveness (see appendix 3 for all output)

Comparing these scores to the 1995 scores (see table 2) the network effectiveness is qualified as being moderately low (comparable to the Akron case).

Perspectives	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)

Table 2: 1995 Factor scores on network effectiveness

In the following, we will present and discuss the results of the Helmond case according to the original propositions by Provan and Milward (1995).

4.2 Proposition 1: Network integration

“Other things being equal, network effectiveness will be enhanced when the network is integrated, but only when integration is achieved through centralization of the network. Networks that are both centrally integrated, through a core agency, and decentrally integrated, through cohesive links among network members, will be less effective than networks that are predominately centralized” (Provan & Milward, 1995, p. 25).

The independent variables were calculated in accordance with the 1995 Provan and Milward study. *Density* was calculated by computing overall network density excluding the core agency. First of all the core agent was identified based on the same criteria used by Provan and Milward in 1995 (the organization that receives most of the funds and provides services to most of the clients by case management). After that density was calculated conform the analysis methods Provan and Milward used in 1995 for network service link density (which reflects the multiplexity of the network) and network organizational link density (which ignores multiplexity). The mean score for network service link density, excluding core agency, was calculated by adding confirmed scores of the network, excluding the core agency, for each of the five types of linkages. The sum was divided by the total number of agencies in the network (119 / 12). The mean score for network organizational link density, excluding core agency was calculated by transforming the service links into dichotomous values (>0 = 1; 0=0). After that the total number of confirmed relations, excluding the core agency, were added and divided by the total number of organizations (68 / 12). Comparing the network density of the network in this study with the network density of the 1995 Provan and Milward cases the result in qualitative terms is that the density is extremely high.

Density	Network Helmond (N=13)
Network density, excluding core agency, service links (mean score)	9.92 (18%)
Network density, excluding core agency, organizational links (mean score)	5.67 (51.5%)

Table 3: Network density scores

- Sample size indicates the number of organizations from which data was collected.

- *Figures in parenthesis indicate links of each type expressed as a percentage of the maximum possible number of links of that type within each system.*

Density	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)
Service link density, excl. core agency (mean)	17,38 (11,6%)	15,91 (9,4%)	16,61 (10,1%)	11.82 (7,2%)
Organizational link density, excl. core agency (mean)	9.22 (30,7%)	9.31 (27,4%)	9,70 (29,4%)	6.79 (20,6%)

Table 4: 1995 network density scores

- *Sample size indicates the number of organizations from which data was collected.*
- *Figures in parenthesis indicate links of each type expressed as a percentage of the maximum possible number of links of that type within each system.*

The mean score for the core agent service link density as indicator for *network centralization* was calculated by adding the total number of confirmed linkages of all five types of service links of the core agency, and dividing it by the total number of organizations (30 / 13).

In addition, the percentage score was computed for reasons of comparison by dividing the total number of confirmed linkages of all five types of service links of the core agency by the maximum possible number of links of the core agency (30 / [1x12x5]).

Furthermore, the total number of agencies with four or more linkages with the core agent was added. The core agent organizational link density was calculated by adding the agencies which were linked to the core agency. The results are displayed in table 6.

Network integration Centralization	Network Helmond (N=13)
Core agent service link density (mean score)	2.31 (50%)
Agencies with ≥ 4 service links to core agency	4 (33%)
Core agent organizational link density (total agencies linked to core agency)	11 (91,7)

Table 5: Network Centralization Scores

- *Sample size indicates the number of organizations from which data was collected.*
- *Figures in parenthesis indicate links of each type expressed as a percentage of the maximum possible number of links of that type within each system.*

Comparing these results with the 1995 Provan and Milward cases (see table 7) network centralization is considered to be extremely high. Finally, with regard to network integration, the *concentration of influence* was calculated. Concentration of influence within the network was measured by structural position. A percentage score was computed for the number of times the organizations were mentioned with regard to the questions, whether the needs, goals, decisions, and/or expectations of other network organization are generally taken into consideration when the respondents' organization's top management makes major decisions related to the services it provides to this specific client population. The five organizations mentioned the most were considered as the five most influential organizations.

Concentration of influence	Network Helmond (N=13)
Structural position organization 1: Bemoeizorg	67%
Structural position organization 2: Mental Health Care Institution GGZ Helmond	67%
Structural position organization 3: Addiction Centre Novadic-Kentron	50%
Structural position organization 4: Social Shelter	42%
Structural position organization 5: Police	33%

Table 6: Concentration of influence scores

- *Sample size indicates the number of organizations from which data was collected.*

Since the first two organizations ('bemoeizorg' and 'GGZ Helmond') were equally influential and the distances between the influence scores were very small (the fifth organization still had 50% of the score of the most influential organization), the network was labeled as strongly dispersed.

In addition, several organizations in the network did not provide information on this question. In the follow up interviews it became clear that these organizations either didn't make a specific policy for this client population (in most of the cases) or that they did not consider the needs, goals and expectations of any other organization in making decisions with regard to services to 'bemoeizorg' clients.

Table 7: Effectiveness and Centralization of all five networks

Variable	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)	Network Helmond (N = 13)
Y: Average score Network Effectiveness 1995 (family +client perspective)	Low (-.19)	Moderately low (-.12)	Moderately high (-.02)	High (.42)	<i>Moderately low</i>
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)	<i>Moderately low</i> (-.082)
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)	<i>Moderately low</i> (.082)
X1: Network Integration: Density					
Service link density (mean)	17.9 (11.16%)	17.7 (10.11%)	17.9 (10.5%)	13.8 (8.1%)	11.46 (19.1 %)
Organizational link density (mean)	9.6 (31%)	9.9 (28.3%)	10.3 (30.3%)	7.5 (22.05%)	6.1 (50.6 %)
Network density	Highest	Moderately high	high	low	High
Service link density, excl. core agency	17,38 (11,6%)	15,91 (9,4%)	16,61 (10,1%)	11.82 (7,2%)	9.92 (18%)
Organizational link density, excl. core agency	9.22 (30,7%)	9.31 (27,4%)	9,70 (29,4%)	6.79 (20,6%)	5.67 (51.5%)
X1: Network Integration: Centralization	Decentralized	Centralized	Moderately decentralized	Highly centralized	Centralized
Core agent service link density (mean score)	1.12 (23.12)	2.31 (47.52%)	1.82 (37.5%)	2.41 (49.6 %)	2.31 (50%)
Agencies with ≥ 4 service links to core agency	0 (0%)	6 (17%)	1 (3%)	8 (24%)	4 (33%)
Core agent organizational link density (total agencies linked to core agency)	20 (65%)	33 (94%)	30 (88%)	33 (97%)	11 (91,7)
X1: Network Integration: Concentration of Influence	dispersed	moderately dispersed	concentrated (weak)	concentrated (strong)	Strongly dispersed
Structural position	Dispersed (.71;.48;.48;.48;.45)	Moderately dispersed (.76;.54;.54;.22;.22)	Concentrated (weak) (.56+.26+.24+.21+.21)	Concentrated (strong) (.76;.38;.21;.21;.12)	Strongly dispersed (.67; .67; .50; .42; .33)

Combining the scores of the independent variables with the score of the dependent variable “effectiveness of the network” (moderately low) and comparing this result with the original four cases we conclude the following. The first proposition that is part of the preliminary theory of network effectiveness is confirmed. The combination of a high density (decentral integration) and a high centralization (central integration) is less effective than a network which has a high level of centralization and a low score on network density.

4.3 Proposition 2: External control

“Other things being equal, network effectiveness will be highest when mechanisms of external control are direct and not fragmented. Low network effectiveness will result when external control is indirect and when strong local mechanisms for monitoring and control are absent” (Provan & Milward, 1995, p. 25).

During the data collection it appeared that only the mental health care institution (GGZ Helmond) and the addiction centre (Novadic-Kentron) indicated that they had a separate budget for this specific client population. The mental health care institution had a financial budget of 0.9 % of their total budget reserved for these network activities (€ 172.800,00) and provided three fulltime case managers in terms of human resources. The addiction centre provided the same budget and two full time case managers. This budget and these five case managers form the ‘bemoeizorg’ organization.

All other network members financed the services for these network activities for this specific client population from their overall budget. No separate budget or personnel was available. It was just ‘part of their job’ and these clients were ‘clients as other clients’. However, in most organizations, specific employees devoted their time to the provision of services for this specific client population and maintaining relations with the other network members. Thus, the budget for the network activities came from all organizations which in turn received these funds from the national government (different ministries and other different governmental sources for different projects), municipalities (often multiple as a consequence of a regional focus and of different sources for different projects) and clients (in case of social shelter and housing cooperations). The only organization that formed an exception was the ‘bemoeizorg’-organization that required their funds of the mental health care institution (50%) and the

addiction centre (50%). Consequently the level of external control is qualified as being fragmented.

External control	Network (N=13)
External control	Fragmented

Table 8: External Control Score

- *Sample size indicates the number of organizations from which data was collected.*

In January 2007 a new Law for the provision of Societal Support (in Dutch: Wmo, Wet Maatschappelijke Ondersteuning) has been implemented in the Netherlands. The core philosophy of the Wmo is that citizens take responsibility for their own problems and the problems of the ones living in their community with regard to care, welfare and living (Jansen and Den Uyl, 2004). The implementation of the law is the responsibility of the municipalities. It replaces earlier laws in the areas of healthcare and welfare that were administrated on the level of the national government. The performance of the municipalities will be judged on nine “performance areas” (Schalk, van der Ham & Roozendaal, 2006, Ministerie van Volksgezondheid, Welzijn & Sport [Ministry of Public Health, Welfare & Sport, 2007; Bekkers & van den Dungen, 2006). Within this legislation the national government remains overall responsible, but the municipalities now have become responsible for the implementation. As a consequence, the resources for care, welfare and living are more and more provided by the municipalities instead of the national government. Consequently, budgets received by the national government will decrease and budgets received by the municipalities will increase. Since most organizations have a regional function and, for that reason, active in multiple municipalities, fragmentation of external control, as operationalized in this study, will probably even further increase in the years to come.

Variable	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)	Network Helmond (N = 13)
Y: Average score Network Effectiveness 1995 (family +client perspective)	Low (-.19)	Moderately low (-.12)	Moderately high (-.02)	High (.42)	<i>Moderately low</i>
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)	<i>Moderately low (-.082)</i>
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)	<i>Moderately low (.082)</i>
X2: External control	Indirect	Indirect	Direct/ fragmented	Direct	<i>Indirect/ Fragmented</i>

Table 9: Effectiveness and external control of all five networks

The second proposition is confirmed since the external control is indirect and fragmented combined with a moderately low network effectiveness.

4.4 Proposition 3: System stability

“Other things being equal, network effectiveness will be enhanced under conditions of general system stability, although stability alone is not a sufficient condition for effectiveness. Networks that have recently undergone substantial change will be significantly less effective than stable ones. The impact of stability on network effectiveness will be greater to the extent that the clients of the network are themselves adversely affected by instability and uncertainty” (Provan & Milward, 1995, p. 26).

The ‘bemoeizorg’ network was founded in November 1996. Most organizations were involved from the very beginning (see table 11) and no organizations dropped out in the past five years.

Organization	Network member since
Bemoeizorg organization	11-1996
Mental health care organization GGZ Helmond 't Warant	11-1996
Addiction centre Novadic-Kentron	11-1996
Social shelter organization SMO	11-1996
MEE Foundation	11-1996
Housing Cooperation Woonpartners	11-1996
Social work organization MADIHP	11-1996
Housing Cooperation Compaen	1997
Housing Cooperation Bergopwaarts	1998
Regional Police Department	1998
Health care for the mentally disabled: ORO	01-2001
Aftercare and resettlement organization	don't experience network cooperation
Social affairs at municipality	don't experience network cooperation

Table 10: Entering dates of network members

Despite the fact that “healthcare in the Netherlands is currently undergoing radical transition”³ (Merks-van Brunschot, 2004, p. 5) the network members indicated in the follow-up interviews, without exception, that no big (institutional) changes had occurred and they experienced the network as very stable. However, it is not unlikely that these (recent) institutional changes, that are now external (e.g. implementation of the new Law) or on a policy level (e.g. transition to demand-driven care) will effect the internal network stability in the nearby future. The system is therefore at this point still qualified as being stable.

³ This quotation refers to institutional changes as: a greater emphasis on coordination on the community level, which leads to a changing ratio between governmental and individual responsibilities to provide adequate care. Also the implementation of the new law on the provision of societal support (Schalk et. al, 2006); a transformation from supply-driven to demand-driven organisation of care within the health care sector related to a changing relation between health care and clients’ (Rijckmans 2005).

Variable	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)	Network Helmond (N = 13)
Y: Average score Network Effectiveness 1995 (family +client perspective)	Low (-.19)	Moderately low (-.12)	Moderately high (-.02)	High (.42)	Moderately low
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)	Moderately low (-.082)
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)	Moderately low (.082)
M1: System stability	Unstable	Unstable	Stable	Stable	Stable

Table 11: Effectiveness and system stability of all five networks

The third proposition is quite complex and contains many dimensions. With regard to our case we also have to admit that there seems to be a discrepancy between material developments in the environment and the perception of decision makers within the network. However, given the overall idea of the proposition that system stability is expected to enhance effectiveness in case of overall favorable conditions we would have expected a higher effectiveness. We therefore regard the third proposition as not being confirmed since the network perceived itself as being embedded in a highly stable environment and also being itself quite stable combined with a moderately low level of network effectiveness.

4.5 Proposition 4: Resource munificence

“When a network is embedded in a resource-scarce environment, network effectiveness will range from low to moderate, depending on other network/system characteristics. When a network is embedded in a resource-rich environment, network effectiveness will range from low to high, depending on other network/system characteristics” (Provan & Milward, 1995, p. 27).

We calculated resource munificence in the following way. In 2006 mental health care spending in the Netherlands was € 4182 million⁴. The average population in 2006 was 16,346 million people (16,334 on 1 January 2006 and 16,358 on 1 January 2007⁵). The mental health care spending was divided by the average population which resulted in a per capita mental health care spending of € 255,84.

However, since the Provan and Milward study took place in a different time period and a different institutional context this number has to be adjusted for both inflation as well as buying power to make cross case comparison possible.

Since Provan and Milward based their calculation of resource munificence on 1990 statistics, the per capita mental health care spending in the Netherlands in 2006 was adjusted for inflation with the base year 1990. Consequently, the per capita mental health care spending, adjusted to 1990, is € 169,43.

Finally, this number was further adjusted for the different institutional context (The Netherlands versus the USA). Purchasing power parities were used to convert the number into US Dollars as well as adjustment for differences in purchasing power between the Netherlands and the US. The purchasing power parity for 1990 between the USA and the Netherlands is 0.911 (OECD, 2006). Therefore, the per capita mental health care spending, adjusted for both time and institutional context is \$ 185,98 ($169,43/0.911$). Comparing this with the resource munificence in the context of the 1995 networks (see table 10) the resource munificence in the Netherlands is extremely high.

⁴ The mental health care spending was obtained by e-mail from the Central Bureau of Statistics (CBS) at 9 August 2007.

⁵ The population at 1 January 2006 and 1 January 2007 was obtained by e-mail from the Central Bureau of Statistics (CBS) at 9 August 2007.

Variable	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)	Network Helmond (N = 13)
Y: Average score Network Effectiveness 1995 (family +client perspective)	Low (-.19)	Moderately low (-.12)	Moderately high (-.02)	High (.42)	<i>Moderately low</i>
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)	<i>Moderately low</i> (-.082)
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)	<i>Moderately low</i> (.082)
M2: Resource munificence	low	high	low	high	<i>Highest</i>
Resource munificence	\$ 19,76	\$ 45,33	\$ 23,79	\$ 52,34	\$ 185,98

Table 12: Effectiveness and resource munificence of all five networks

The fourth proposition is confirmed since the resource munificence is extremely high but the network effectiveness remains moderately low. Technically speaking, the proposition is formulated in a way that it cannot be rejected for high resource munificence, because all outcomes are possible. However, one would usually assume that effectiveness increases with a high resource munificence, especially if it is that much higher than all the other cases. The fact that the result is contradictory to this assumption confirms the idea that resource munificence is a necessary condition but that sufficient (financial) resources do not make a network automatically effective.

5. Discussion and conclusion

5.1 Material outcomes of the study

In sum, it appears that the network under study has a dense, highly centralized structure with fragmented external control and a strongly dispersed concentration of influence and is

situated in a stable and resource-rich environment. Table 13 shows an overall comparison with the original cases and one can see that the Helmond network resembles the Akron case from the original 1995 study with the exception of system stability. In the results section we reported that three out of the four propositions were confirmed. Regarding the first proposition, it is confirmed that networks with a high density (decentral integration) and a high centralization (central integration) are likely to be less effective than networks which have a high level of centralization and a low score on network density. However, given the fact that the centralization is very high in the Helmond network, we would have expected a higher score on network effectiveness in this case since both system stability and resource munificence are also quite high. The confirmation is therefore not very strong.

The second proposition is confirmed since the external control is indirect and fragmented combined with a moderately low network effectiveness. Given the overall “favorable” conditions of the Helmond network according to the theoretical model one would expect the network to be effective. However, the network only scores “moderately low” on effectiveness, which also came as a surprise to the professionals in the network. It therefore seems to us that the independent variable “external control” deserves some extra attention since it constitutes the only variable that can explain the relatively low effectiveness score. First, this circumstance emphasizes the importance of network control for the effective management of inter-organizational networks, a topic, that has recently been getting increasing attention (Kenis & Provan 2006, Korssen 2006).

Variable	Network Tucson (N = 32)	Network Akron (N = 36)	Network Albuquerque (N = 35)	Network Providence (N = 35)	Network Helmond (N = 13)
Y: Average score Network Effectiveness 1995 (family +client perspective)	Low (-.19)	Moderately low (-.12)	Moderately high (-.02)	High (.42)	Moderately low
Client assessment of Network Effectiveness (QOL)	Low (-.18)	Moderately low (-.06)	Moderately high (-.17)	High (.43)	Moderately low (-.082)
Case manager/therapist assessment of Network Effectiveness	Moderately high (.18)	Low (-.29)	High (.28)	Moderately low (-.08)	Moderately low (.082)
X1: Network Integration: Density					
Service link density (mean)	17.9 (11.16%)	17.7 (10.11%)	17.9 (10.5%)	13.8 (8.1%)	11.46 (19.1 %)
Organizational link density (mean)	9.6 (31%)	9.9 (28.3%)	10.3 (30.3%)	7.5 (22.05%)	6.1 (50.6 %)
Network density	Highest	Moderately high	high	low	High
Service link density, excl. core agency	17,38 (11,6%)	15,91 (9,4%)	16,61 (10,1%)	11.82 (7,2%)	9.92 (18%)
Organizational link density, excl. core agency	9.22 (30,7%)	9.31 (27,4%)	9,70 (29,4%)	6.79 (20,6%)	5.67 (51,5%)
X1: Network Integration: Centralization	Decentralized	Centralized	Moderately decentralized	Highly centralized	Centralized
Core agent service link density (mean score)	1.12 (23.12)	2.31 (47.52%)	1.82 (37.5%)	2.41 (49.6 %)	2.31 (50%)
Agencies with ≥ 4 service links to core agency	0 (0%)	6 (17%)	1 (3%)	8 (24%)	4 (33%)
Core agent organizational link density (total agencies linked to core agency)	20 (65%)	33 (94%)	30 (88%)	33 (97%)	11 (91,7)
X1: Network Integration: Concentration of Influence	dispersed	moderately dispersed	concentrated (weak)	concentrated (strong)	Strongly dispersed
Structural position	Dispersed (.71;.48;.48;.45)	Moderately dispersed (.76;.54;.54;.22;.22)	Concentrated (weak) (.56+.26+.24+.21+.21)	Concentrated (strong) (.76;.38;.21;.21;.12)	Strongly dispersed (.67; .67; .50; .42; .33)
X2: External control	Indirect	Indirect	Direct/fragmented	Direct	Indirect/Fragmented
M1: System stability	Unstable	Unstable	Stable	Stable	Stable
M2: Resource munificence	low	high	low	high	Highest
Resource munificence	\$ 19,76	\$ 45,33	\$ 23,79	\$ 52,34	\$ 185,98

Table 13 : Interpreting the results in comparison with the 1995 scores

- Sample size indicates the number of organizations from which data was collected.
- Figures in parenthesis with regard to density and centralization indicate links of each type expressed as a percentage of the maximum possible number of links of that type within each system.
- Figures in parenthesis with regard to concentration of influence indicate the scores of the five most influential organizational network members.

Second, the results of the Helmond case hint to the issue that the dispersed funding structure with a subsequently fragmented control structure even in case of a high resource munificence might have detrimental effects on the effectiveness of the networks despite the fact, that the overwhelming amount of money ultimately comes from the central government but is funneled through very diverse channels to provide the services. However, as a limitation one has to consider that other types of internal network control might be used that are not covered by this proxy via the resource structure which implies that payment is accompanied by control measures. Moreover, to include the type and intensity of external control into the concept of “network structure” seems somewhat problematic. It might therefore be useful to think about a reconceptualization of the control variable in future studies in order to include more dimensions of network control.

As reported above, we regard, with some limitations, the third proposition on system stability as not confirmed. This variable is the only one that does not fit the overall pattern and therefore needs further investigation. Especially the question whether to include the information on the perceptions of the decision makers within the network or look for more material evidence seems important.

The fourth proposition is confirmed since the resource munificence is, compared to the other cases, extremely high but the network effectiveness remains moderately low. This confirms the idea that resources are a necessary but not a sufficient condition for network effectiveness. As a limitation one has to take into account, however, that only financial resources are included and the quality of human resources for example is not taken into account in the operationalization. Also to what extent a network really can profit from an overall resource rich environment measured in per capita spending might differ between institutional contexts. To sum up, given the general “fit” of the patterns of the Helmond case with the overall model we regard this study to be an extension of the preliminary theory of inter-organizational

network effectiveness and argue that the additional case has produced additional evidence that the model is worth to be further investigated (see discussion below on possible outcomes of replications). However, the model as it is formulated right now, contains multiple and probably conjunctural causation. It is therefore at this point hard to precisely state which independent variable maybe in conjunction with others causes the moderately low effectiveness of the Helmond network.

5.2 Replicating studies as a tool for the further development of a network theory of effectiveness?

Conducting a replication study, and by doing so contributing to theory development, scholars have to overcome multiple challenges. Based on our own experience, and without any claim of being exhaustive, we will discuss the following challenges that need to be overcome in replicating research in the area of network effectiveness:

1. attain similar data;
2. attain comparable results;
3. achieve a valid comparison across results;
4. incorporate methodological progress

The first challenge is to *attain similar data*. In order to do so researchers need similar cases, therefore a first prerequisite is to have an elaborate case description of the cases used in the original study. The next step is to find similar empirical cases for the replication study. Since one has to deal with constraints that are a consequence of the need for similar cases, additional time and energy have to be invested in case selection, which is especially difficult in inter-organizational networks.

If similar empirical cases are available, the theoretical concepts and variables of the study one wants to replicate should preferably be operationalized in the same way. If not, the construct validity of the study is endangered and researchers end up measuring different concepts

compared to the original study resulting in bias in the theory one wants to contribute to. After the operationalization, the way to measure these concepts and variables also have to be carried out with the same indicators. The most ideal situation is if one can obtain the same measurement instruments as used in the original study, if these measurement instruments are not present anymore, the underlying concepts are the best alternative. Therefore, the second and third prerequisite for doing replication research are respectively a concrete description of the operationalization of the concepts and variables used in the original study as well as the measurement instruments (e.g. questionnaires, interview methods and questions, observation techniques).

The second challenge is to obtain *comparable results*. Once data has been gathered, it has to be analyzed preferably in the same way in order to attain results that can be compared to the original results. Therefore, one needs to know the analysis techniques, formulas and analysis programs used in the original study.

Third, once the results are known they have to be *compared to the original results* in order to enable the researcher to say something about the original study and draw conclusions. This study used the original results as an empirical template to compare the results across cases. Therefore, the challenge was to display the results in the same manner as in the original study (e.g. the quantitative-qualitative linkage) and to use the same cross-case comparison techniques as used in the original study. Researchers need several prerequisites to do so. First, one needs the criteria used for the different scoring categories (what is high, what is low?). Second, researchers need to know the approach used and the necessary information for cross-case analysis. Preferably, the original data should be available in order to recalculate and reanalyze the scores.

The fourth challenge is *how to incorporate methodological progress*. Sometimes, we will only be able to replicate studies after several years in which considerable progress on

methods and techniques has been made. In network analysis, we now have much better concepts and software at our hands to calculate and visualize node centrality, different influence measures and network centralization compared to the early 1990s. For example, in the original 1995 study, *centralization* was measured using the density score of the core agency. Since density is dependent on network size as well as multiplexity it is not well suited for comparative studies. Although the 1995 networks were of roughly the same size and for all networks the same multiplexity (5) was measured, this was not directly a problem for the 1995 study but it is a problem when one tries to constitute a (preliminary) theory. After all, the theory is only valid for networks of the same size and the same multiplexity, which makes precise replication very hard. Furthermore, replicating the study, and in this way testing the theory, is highly constrained as a direct consequence of the use of a density score for network centralization. In addition, from a current perspective, core agent service link density is not the most appropriate measure for network centralization. First of all, the core agency is a priori identified (the organization receiving the most funds and treating most clients by case managers). Identifying the core agency by network analysis would, in our view, now be a better choice since, in this way, relational variables are used. Second, the results of network density and network centralization are no independent measures since a high network density is likely to lead to a high network centralization if centralization is measured by core agent service link density. For measuring centralization a pure centralization measure could now be used (based on either degree, betweenness or closeness) to avoid these problems.

Another case in point is *multiple and conjunctural causation*.. Provan and Milward studied the effect of six independent variables (density, centralization, concentration of influence, external control, system stability and resource munificence) on network effectiveness. Therefore, the preliminary theory contains multiple as well as conjunctural causation. The

combination of low density, high centralization, high concentration of influence, direct external control and a stable and resource rich environment are proposed to lead to an effective network in terms of client well-being. Although we truly believe that all these variables have their effect on network effectiveness, the problem is that the interpretation of network effectiveness scores remains problematic. For example, the Helmond network scores positive, in the context of the preliminary theory, on centralization (high), stability (stable) and resource munificence (high). Therefore, a high effectiveness can be expected. However, the network scores negative on the variables density (high), concentration of influence (dispersed) and external control (fragmented). Therefore, a low effectiveness can be expected. The network effectiveness is moderately low, but what does this mean? For example: does it mean that the negative relation between density and network effectiveness is more influential than the positive relationship between centralization and network effectiveness? Or that the combination of the three independent variables (density, concentration of influence and external control) which have a direct effect on network effectiveness overrule the combination of one independent variable (centralization) and two moderating variables (system stability and resource munificence)?

It certainly would be valuable to replicate the research with regard to data collection and analyze the results with the Boolean approach of the comparative method as described by Ragin (1987) since this method claims to be “especially well suited for addressing questions about outcomes resulting from multiple and conjunctural causes” (p. x).

In order to be able to use new methods and techniques, however, one needs the original data, to be able to merge them with the data from the replication case(s) and (re)do the analysis.

To be clear, theoretical framework and the operationalization of the theoretical concepts used in the 1995 study, especially seen in the context of the time period in which this study took place, are still remarkable and impressive. Conducting the replication even increased our

respect for this study. However, not surprisingly, from a current standpoint, one would probably operationalize some concepts differently and use different techniques. The question then arises to what extent using the latest state of the art methods and techniques is possible if one wants to assure comparability. This is especially valid in a young field like inter-organizational networks in which we will (hopefully) see more progress in the years to come.

Challenge	Prerequisites
Similar data	<ul style="list-style-type: none"> • Case description of case(s) used in original study • precise operationalization used in original study • Original measurement instruments
Comparable results	<ul style="list-style-type: none"> • Original analysis techniques • Original formulas • Analysis programs used in original study
Cross-case comparison	<ul style="list-style-type: none"> • Criteria for scoring categories • Techniques used for interpretation of the results • All information for cross case comparison (e.g. standard deviations)
Incorporating methodological progress	<ul style="list-style-type: none"> • Identify progress in methods and techniques • Use most recent methods and techniques in the spirit of the original concepts, especially if original data is still available

Table 14: Challenges and prerequisites for replication research

On the basis of our experiences we conclude that replicating research is highly underestimated. Doing a replication study means to not only be constrained in the work one is doing because one has to strive for similarity and comparability. In addition, researchers are also highly dependent on the researchers who conducted the original study for providing the necessary information and even more than usual on the respondents to agree with the tight design. When the prerequisites are not available, one has to be creative achieving comparability with different means. The consequence of a tight design, which is inevitably

related to replication research, is that the researcher does not have the leeway and flexibility to meet the wishes from respondents in the field. Therefore, to secure cooperation takes more time and energy, not only with regard to carrying out the research but also with regard to maintaining good relations within the field. Therefore, in order to successfully conduct replication research not only requires good scientific but also social skills and the ability to convince people of the importance of following through with a certain design. In addition, if we want to be able to further develop a network theory of effectiveness, using at least partly the suggested replication strategy, we would need to solve two organizational challenges. First, we would need to establish a location accessible to researchers, where a replication protocol would be stored, i.e. where researchers who publish original studies in major journals would store the information needed to (partly) replicate the study (see table 14 above) and preferably after some years also the original data, so that new techniques together with new data could be applied. It would of course be preferable to have the information necessary for replication published in the original article. However, given the increasing pressure on page limitations an outside storage with the information in the article how to access it is probably more realistic.

Second, in order to create an incentive for researchers to engage in replication research, publication space would have to be created and criteria established and publicized to assess this type of research. As experiences from other disciplines like marketing (Evanschitzky et al.2007) show, it might not be easy to get replication research published especially if it is “just” adding another case. If it turns out as a problem to get replication research published as full blown articles in reputable public management journals, one could for example think of introducing a category “research notes”, where this type of research could be presented in a very compact way of about 2000 to 3000 words. This might also encourage researchers outside Western-European and North American countries to replicate studies in different

institutional contexts which could increase the external validity of theories mainly developed in Europe and North America.

Despite these problems we would like to conclude that replication of earlier research even through single or comparative case studies is a valuable way to create cumulative knowledge and in this way attain an empirically valid theory, especially in a field of research that is as young as inter-organizational networks. As Rosenthal (1991) claims, even the unsuccessful replication that was imprecisely conducted can significantly contribute to theory development in as it limits the theory. In our view, replicating studies in a different institutional context compared to the original setting, as was done here, probably qualifies as “imprecise replication” and therefore would contribute at least to the extension or limitation of the theory.

		Result of Replication	
		Successful	Unsuccessful
Precision of Replication	Fairly precise	Supports the theory	Damages the theory
	Fairly imprecise	Extends the theory	Limits the theory

Figure 2: Effects on Theory of the Success of Replication and the Precision of Replication (taken from Rosenthal 1991:5)

In building a house, the foundation should be strongly attached to the ground preventing that the house will crash at a latter time. Building a theory is similar in that the first assumptions, on which the theory is built, have to be grounded in the data or as Glaser (1978) put it: a good theory is one which fits the data (in: Miles & Huberman, 1994). As has been shown in the paper, replicating studies has its own problems and challenges. However, we strongly believe that given the considerable methodological challenges in the research on the effectiveness of inter-organizational networks, we will have a better chance to build solid theoretical

foundations by making the construction project a collective enterprise. It is therefore worthwhile to further assess the potential of replication research in this endeavor.

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