Do public networks really work?

An essay on public network performance and its determinants.

Laura Maccio'

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Board of Examiners:

Prof. Daniela Cristofoli, Università della Svizzera Italiana - Thesis Supervisor

Prof. Marco Meneguzzo, Università della Svizzera Italiana – Internal Examiner

Prof. Erik-Hans Klijn, Erasmus University Rotterdam – External Examiner

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INTRODUCTION

Since the early Nineties, public networks have been placed centre stage to solve "wicked" problems and are considered the multi-organizational arrangement 'par excellence' to achieve solutions that are difficult to obtain by individual organizations. Subverting traditional bureaucracies and hierarchies (Ferlie et al., 2003; Rhodes, 1996), the network society has taken the scene by storm (Raab and Kenis, 2009; Lipnack and Stamps, 1994) with scholars studying the topic and literature on public networks developing significantly as a consequence.

The study of networks can be traced back to studies of interorganizational relations outside the boundaries of organizations and focusing on the relationships between organizations and their environment (Thompson, 1967). Seeking new methods to coordinate different but interdependent agencies, sociological studies looked at interorganizational networks as a new framework for the interactions of groups of organizations (Ewalt, 1966). At the same time, managerial studies began investigating how to control and influence environmental complexity to fulfil management objectives (Zaald, 1966). Hence, a key issue has been to identify the boundaries of interorganizational networks and consider the interaction structure rather than their constraints (Porter, 1980; Warren, 1967). Networks are regarded as the third governing structure beyond bureaucracy and markets, characterized by aspects such as reciprocity and interdependencies and by a variety of individual and organizational actors with different goals. In 1997, O'Toole defined interorganizational networks as "…structures of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the others in some larger hierarchical arrangement" (45).

Starting from these organizational perspectives and driven by the need to improve the management of intergovernmental relations, the "public management network" community (as defined by Berry, 2004) also focused on the study of interorganizational networks in the public sector. Public management and administration scholars began investigating whether networks exist and how they function (Mandell, 1988), how managers can successfully manage these, what competences and skills are needed for this purpose (Agranoff and McGuire, 2001; Klijn, 1996) and the impact that networks have on service delivery and customer satisfaction (Agranoff and McGuire, 2003;

Provan and Milward, 1995). Among these studies, two main approaches can be identified (Klijn, 2008): the "American" perspective, which is more managerial-oriented and the "European" perspective with a governance-oriented focus. The American tradition puts emphasis on service delivery and implementation networks, looking mainly at the configuration of the network structure for collaboration (Provan and Milward 1995; Provan and Sebastian 1998; Huang and Provan 2007) and the context in which interactions take place. The European perspective instead mainly investigates governance networks, looking at the complexity of public decision-making and effective governance, linking network effectiveness with the mechanisms facilitating partner interactions (Klijn 1996; Kickert et al., 1997; Agranoff and McGuire, 2003) and network management capabilities (Klijn et al., 2010).

Notwithstanding these different approaches, public networks are frequently regarded as a key interorganizational form to manage interdependencies and complexity through formal and informal ties between public and private actors aggregated around shared interests or common problems in decision-making and service delivery processes. As stated by Pollit and Hupe (2011: 650) "Networks are envisaged as the more adequate way to make sense of contemporary complexity". Indeed, 'wicked' problems call for solutions other than contracting out, raising issues such as the need to serve collective actions, to put forward new governance mechanisms and to face new complexities and interdependencies (Isett, 2010). Based on horizontal ties and horizontal and non-hierarchical coordination mechanisms, networks can steer interdependencies and render the isolation of public providers or decision-makers impossible: they imply governance without government (Mayntz, 2002) and involve public, private and non-profit actors in the formulation, implementation and provision of collective goods and services. For all these reason, public networks have been associated with the attributes of quality, flexibility and innovativeness. The engagement of public actors in organizational networks for different purposes has become more the rule than the exception (Ferlie, Hartley and Martin 2003; Rhodes 1996). They are seen as strategic choices able to manage the cognitive, strategic and institutional uncertainties (Bueren et al, 2003) typical of contemporary societies where problems are characterized by lack of knowledge, the involvement of many interdependent actors and various decision-making arenas. Hence, public networks have represented for scholars,

practitioners and policy-makers an easy way to reduce fragmentation and improve coordination among public agencies, thus increasing the efficiency and effectiveness of service provision, policy formation and implementation.

Despite this euphoria on networks as the best solution, in 1997 O'Toole's call to "treat networks seriously" implied understanding how they perform, how to measure their performance and what affects their results. This is also the aim of the overarching question of this study: *Do public networks really work?*

Many authors have doubts, "Not all is in peace and harmony in networks… and network management must be placed upfront as an essential arena of examination" (Agranoff and McGuire 2001: 323). Public managers should take advantage of networks but the negative consequences of networks need to be addressed, "we tend to see the positive sides of network structures without examining the possible negative side, such as convergence toward groupthink, dependence on effective leaders and collaboration skills, and possible inefficiencies due to participant turnover and communication and meeting costs." (Berry et al, 2004: 550). Many authors have questioned the effectiveness, accountability and legitimacy of networks. Networks cannot be considered as the perfect solution to promoting good governance and service effectiveness or as the panacea for contrasting wicked issues. In turn, good governance should be regarded as a normative statement that involves "the steering of society through networks and partnerships between governments, businesses, corporations and civil society associations" (Pollit and Huge, 2001: 647). The New Public Governance paradigm (Osborne, 2006) requires not only governance mechanisms and inter-organizational relations but also the need to investigate and explain the processes and outcomes of networking settings. Networks cannot be regarded as good per se, and the drawbacks should be addressed (Provan and Lemaire, 2012; Kenis and Provan, 2009; Milward and Provan, 2000; Kickert, Klijn and Koppenjan, 1997): they necessarily imply complex coordination, accountability concerns, instability, coordination difficulties and cost, management complexity, loss of autonomy, conflict and power issues.

Network failure is becoming a contemplated possibility for both practitioners and scholars, and negative outcomes are no longer an exception (Provan, Fish and Sidow, 2007), "if a network approach is judged to be the best strategy given the demands of the

task, success is still far from assured" (Provan and Lemaire, 2012: 642). For instance, particularly in the early stage of development, lack of internal and external legitimacy and support can lead to the failure of the network (Human and Provan 2000). Furthermore, network endurance cannot be taken for granted since the external environment, resources and uncertainty (Provan and Milward 1995) can play a key role.

Therefore, it is important to understand today whether and how public networks really work. Due to their intrinsic and overriding public function, public networks must be assessed and made accountable to the public they are intended to serve: "we must be able to measure the outcome and the performance of networks in order to assess how accountable a particular network is to its stakeholders and for achievement of its stated goals" (Agranoff and McGuire 2001: 311). At the same time, policy makers need to closely evaluate network effectiveness to better serve public needs in view of scarce public resources (Provan and Milward, 2001: 414). This requires going back to the origin of networks: the best way of managing these wicked problems is essentially to investigate how public networks operate, define their main successful attributes and how they should be designed, governed (Lindencrona et al., 2009) and assessed.

From all these considerations, two sub-research questions arise: *'How can we evaluate public network performance?'* and *'What are the determinants of network performance?'*

To clarify these points, the following sections will define public networks, public network performance and their determinants. Thus, the research questions will be discussed, the object of study clarified, the methodology introduced and the research structure presented.

1. Public networks

Only recently, literature has disentangled the links between public administration and other traditions and identified three main types of public networks, referring to specific research traditions (Klijn, 2008; Isett et al. 2011; Moran, 2013):

1. Policy networks lie in the political science tradition and involve public agencies, legislative bureaux and other (public, private or non-profit) organizations for decision-making and policy formation.

2. Implementation/public service delivery networks can be traced back to organizational studies focusing on providing public services: they cluster public

and private organizations and actors for the creation of public goods, solving the impossibility of the unique involvement of the public or private sector.

3.   Governance networks are a combination of the first two types. They are the essence of public administration studies since they aim at both policy formation and implementation through coordinating organizations and actors "toward a common goal rather that the policies or products that the networks actually produce" (Isett et al, 2011: 158).

On one hand, these three streams reflect the different sides and interest in public administration tradition (Berry et al, 2004) with scholar studying three different types of networks. On the other hand, they clearly show that the term "public network" is overloaded with meaning since the object of study varies enormously: networks involved in the decision-making process, networks for the provision of public services or networks managing horizontal governance relations to solve public problems. Moreover, some authors (Klijn, 2008; Berry et al., 2004) note that these three different research streams have clear geographical connotations: if policy networks are transversal to both USA and EU research communities, governance networks are mainly investigated in the EU and service delivery in the USA.

In addition to their focus and their geographical origins, the main themes differ. Policy networks are defined by Rhodes and Marsh (2003: 4) as "meso-level concept of interest group intermediation which can be adopted by authors operating with different models of power distribution in liberal democracies". Here, the main issues refer to the involvement of actors in the decision-making process, the power relations among them and their effects on policy decisions and agenda setting (Klijn, 2008).

Service delivery networks are "networks of service providers operating in local communities" (Provan and Milward, 2001: 416) developed as a consequence of the devolution process. Dealing with structural arrangements for the joint provision of services, research interest is concentrated on the implementation, management and coordination for effective services, namely, "how public policy is implemented through networks of cooperating service providers" (Provan and Milward, 2001: 414).

Governance networks are "structures of interaction between public and private actors through which public policies are made" (Borzel, 2011) aimed at solving wicked problems. The main concerns for this research stream are processes and structures that,

managing governance relations and connecting the network to traditional institutions, lead to common decision-making process.

Finally, considering these three traditions, their research focus, their similarities and inferences, a further factor becomes clear: the use of the word network is widespread but blurred in public administration literature (Isett et al., 2011) since it is used as a "metaphor" of a social phenomenon or as a methodological paradigm and analytical tool (Borzel, 2011). At times, the term "network" refers to an organizational concept that does not necessarily reflect a structured body but the organizing principle of a group. Alternatively, it is embedded in the language of social network analysis and reflects this method and the measures of its structural components. Finally, this term is also conceived as a formal tool (bound by formal or informal contracts) for managing and providing public services.

Given this plethora of approaches and definitions, it is essential to specify the definition and research approach adopted here. In accordance with extant literature, this dissertation defines public networks in line with the second type of definition: networks that "primarily deliver and manage a variety of public services and that previous authors have variously named providing networks, provider groups, managed network), service implementation network" (Turrini et al., 2010:529), community-based networks (Provan and Milward, 2001) and collaborative networks (Klijn, 2008; Isett et al., 2011; Moran, 2013). These are "instrumental" (Keast and Mandell, 2009; Provan and Lemaire, 2012) and goal-oriented networks, mainly publicly funded, with participants belonging to different sectors and variously committed to network goals (Provan and Kenis, 2007; Provan and Lemaire2012). They can be formally mandated through a top down process but can also arise from the grassroots level, their boundaries can be formally stated but may also be fuzzy (Provan and Kenis, 2007; Provan and Lemaire, 2012).

Although focusing on a specific type of public network, this dissertation considers both organizational and public administration studies. In fact, as stated by Klijn (2008), "It is not surprising, therefore, that a discerning reader may notice increasing levels of overlap and mutual exchange between these traditions". This approach shares Berry et al.'s (2004) view asserting the need to merge traditions, research methods and questions for all the "networks we look at for public management and policy change". The study

of service delivery networks should be able to incorporate typical elements of governance networks focusing not only on the actual provision of services but also on the decision-making and goals definition processes.

2. Public network performance

Defining the performance of service delivery networks is a difficult task. They are goal-oriented networks with various constituencies and, as a consequence, need to satisfy multiple but frequently conflicting stakeholder interests (of customers, clients, taxpayers, politicians, multiple organizations, to mention a few). These two main attributes - goal-orientation and conflicting stakeholder interests - often create tension and a trade-off in defining and evaluating network performance. On one hand, it is difficult to strike a balance between the two and, on the other, network results need to be defined and measured and choices must be made. This tension and the need for a solution are clear in the comparison between EU and USA literature: the former mostly focuses on the interdependence of multiple stakeholders in networking settings and the latter on the goal-oriented attribute. In order to reach a possible compromise between these two conflicting views, networks should respond to a set of goals in coherence with their key stakeholders (for instance, the community of reference, partner organisations and network members) while a multi-dimensional perspective on network performance and its assessment should be adopted. As Berry et al. (2004: 548) affirmed, "questions about success in network activities must always be asked in conjunction with normative questions about success for what, for whom, and at whose expense". Any performance evaluation and definition, including multi-perspective and multi-measure approaches, should be considered a normative statement that subjectively solves the trade-off between different goals and conflicting stakeholders. Conscious of these difficulties in conceptualizing and measuring public network performance, many authors claim that "despite these problems, networks funded by the public sector can and should be evaluated" (Provan and Milward, 2001). In 1995, Provan and Milward first proposed a multi-perspective and multi-measure approach to assessing network performance, concluding that evaluations and measures depend on the stakeholder perspective that is being considered.

Since then, many authors have proposed various conceptualizations and measures of network performance according to different criteria.

First, some authors conceptualize and measure network performance based on the stakeholder perspective. Some focus on network performance from the partner organizations' standpoint, referring to the returns from their membership; some take into account the entire network and evaluated the benefits for people working within the network; others look at matters from the community perspective, recognizing the contribution to the pool of clients served by the network.

Other studies stress the conceptualisation and measures of network performance based on the intrinsic characteristics of the network itself. Some authors evaluate network performance by looking at the network's ability to survive in the long term. According to others, networks can be considered successful when collaboration between partners works. Yet others focus on the ability of the network to achieve its expected objective.

The resulting landscape is still perplexing and implies the need to understand the intrinsic meaning of network performance and its measurement criteria, "it is arbitrary to label one criterion a priori as the correct one because each presents a valid point of view" (Kenis and Provan, 2009). Researchers agree on the impossibility of an overall and unique judgement of network performance since network evaluation is an assumption of responsibility, a choice that reflects constituency judgements. At the same time, from a normative point of view, any criteria can be legitimate but not all criteria can be used for all networks: some, as an element of fact, may be inappropriate and unreasonable (depending on the network characteristics). Assuming this perspective, this dissertation aims to review the different concepts and measures of network performance and proposes a reliable measure following a multidimensional approach that takes into consideration the different nuances of the term as stated by Kenis and Provan (2009). The multi-constituency perspective does not treat the concept of performance as a single statement "but as a set of several (or perhaps many) statements, each reflecting the evaluative criteria applied by various constituencies involved to a greater or lesser degree with the organization" (Connolly et al. 1980, p. 213).

3. Determinants of public network performance

Understanding successful performance requires opening the black box of public networks and investigating network structural, functioning and managerial

characteristics. Recent trends entail the integration of these traditions through understanding how these characteristics together affect network performance (Isett et al. 2011): structural, managerial, contextual and functioning characteristics coexist and jointly determine the success or failure of public networks.

This thesis deals with the in-depth study of the relationships among these determinants. Indeed, the analysis of public network performance involves understanding and evaluating their structure, their functioning, the role of the different actors within the networks and the outcome both in term of decision-making and implementation (Berry et al., 2004). Turrini et al. (2010) define a model with four determinants of network effectiveness (see Figure 1 below): contextual characteristics, structural characteristics, functioning characteristics and network manager.

FIGURE 1. *Determinants of network performance*
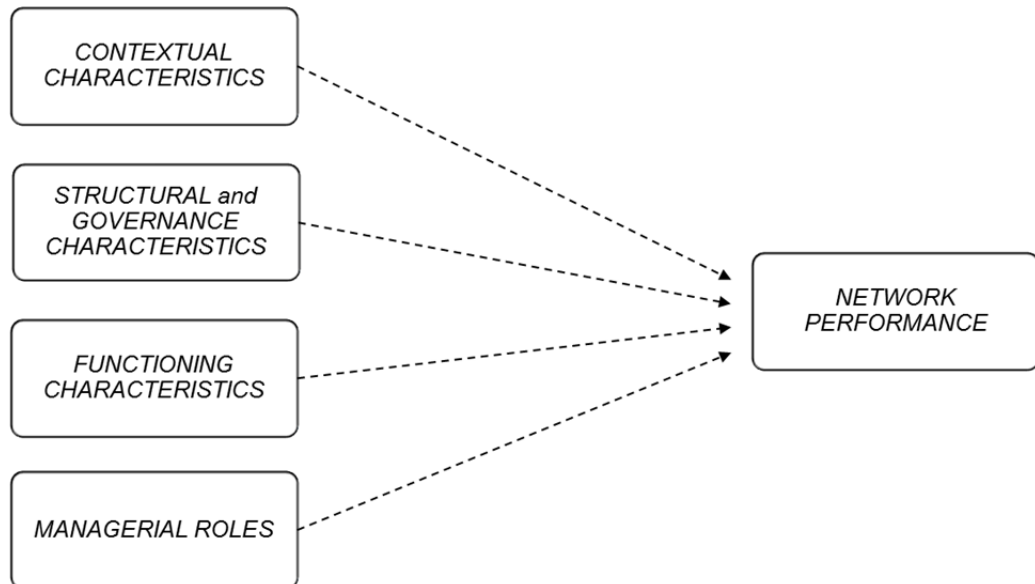
Source: Turrini et al. 2010

First, *contextual characteristics* refer to the external environment affecting public network performance and specifically environmental (in)stability and its causes (including resource munificence and cohesion and support from the broader community) and external controls. *Structural and governance characteristics* reflect the effect of structural and governance factors on network performance. Typical structural characteristics investigated by literature include integration, centralization, the presence of strictly integrated subgroups, network size and composition. Similarly, governance aspects refer to the different modes and degrees of consolidation in which coordination, resource allocation and control among network members are defined. *Functioning*

characteristics include all those (formal and informal) tools and mechanisms that support network management and can influence its performance. We can identify aspects such as: integration mechanisms and tools, formalization and accountability, and inner network stability. Finally, only recently, public management scholars and researchers have focused their attention on the *role of network managers* in terms of success, however, empirical studies testing their arguments are still lacking. Current studies suggest that managers should nurture the network in order to render it functional and steer it through establishing a clear mission and developing strategies and interventions focused on both the network and their organizations.

According to the above considerations, extant studies provide useful insights on the predictors of public network performance, summarising these into a unitary framework and opening new lines of investigation on how these different predictors can jointly affect network performance.

4. Research structure

Based on the above-defined theoretical positioning and definitions, this dissertation uses three articles to investigate the research questions raised so far. Figure 2 illustrates the logical path linking the research questions with the three articles.

FIGURE 2. *The logic linking the research questions with the articles*
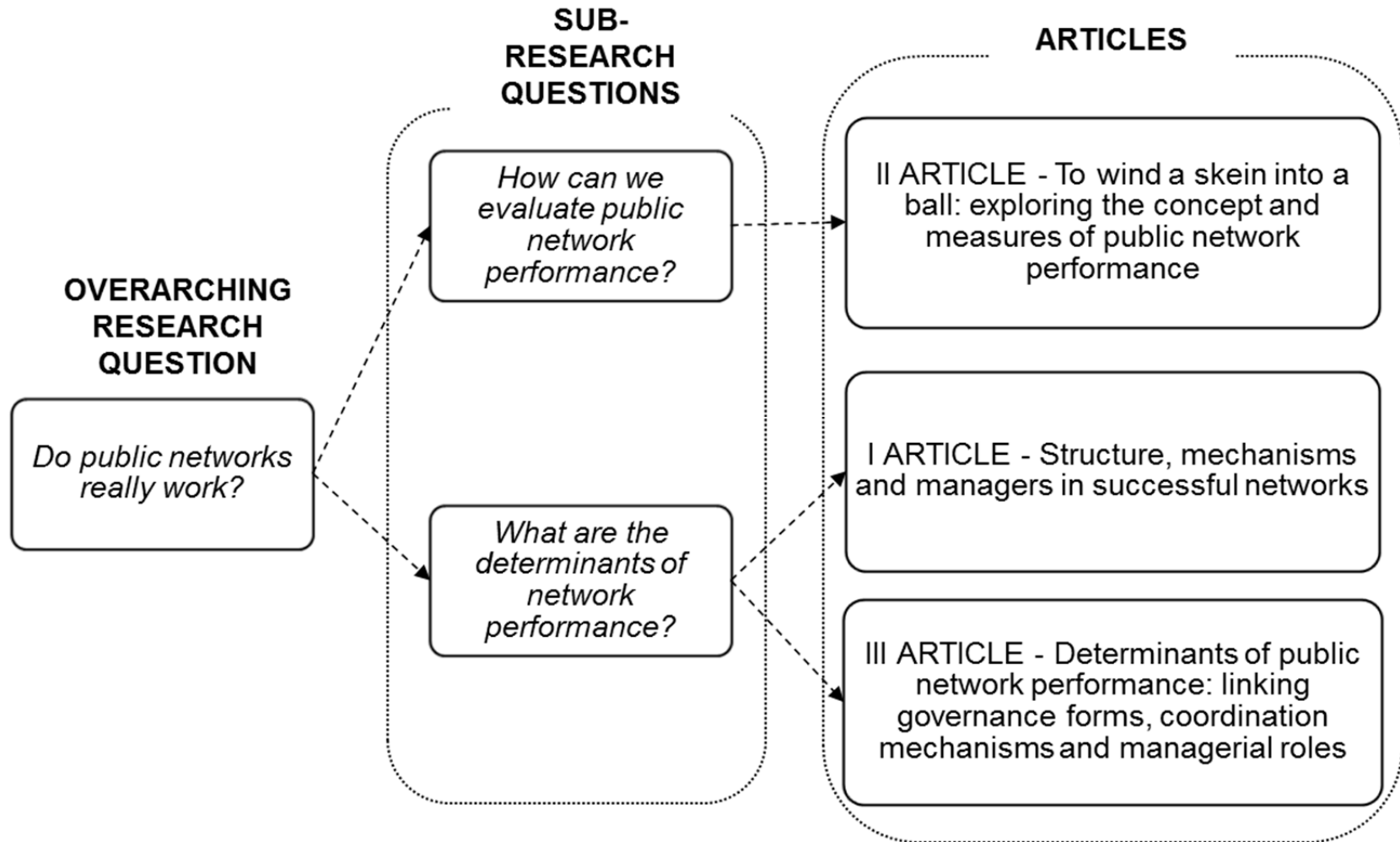
Conceptualizations and measures of network performance are investigated in the second article *"To wind a skein into a ball: exploring the concept and measures of public network performance"*. This systematizes the existing conceptualizations and measures of network performance into a unitary model and, using structural equation modelling, explores its construct validity. Public networks providing homecare assistance in the Italian-speaking part of Switzerland are the empirical setting for this study and 238 persons working for these networks were surveyed, with a response rate of 49.56%.

Determinants of network performance are investigated in the first and third article. The first, *"Structure, mechanisms and managers in successful networks"* takes an explorative and multiple case study approach investigating whether an interaction effect between the determinants of public network performance can be assumed and focuses on five successful networks for homecare assistance in one Swiss Canton.

The third article *"Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles"* also takes an explanatory approach and tests causal relations between performance determinants and network results. The empirical setting is represented by the total population of 575 public networks for the provision of homecare assistance in Switzerland while causal relations are tested through structural equation modelling.

5. Methodological approach

From a methodological perspective, a mixed method approach is employed. This implies the combination of quantitative and qualitative approaches and is based on the idea that several research approaches can ensure sound knowledge of an issue (Creswell 2009). In particular, the so-called *sequential exploratory strategy* was applied, which includes a first phase of qualitative data collection and analysis followed by a second and third phase of quantitative data collection and analysis taking into account the results of the former stages. The choice of this strategy was determined by the goals of this thesis: first, the qualitative phase is intended to explore the phenomenon and the emerging model on network determinants. Thereafter, the quantitative phases aim at developing a new model, the related instrument to measure network performance and generalize qualitative findings on causal relations between performance and its determinants. These are the details of each phase, (as outlined in Figure 3):

1. In the first step, an exploratory multiple case study is developed, attempting to explore whether there may be relationships between network structure, mechanisms and manager(s) that jointly affect network performance. It focuses on five successful networks for homecare assistance in one Swiss Canton, according to the article "Structure, mechanisms and managers in successful networks".

2. In the second step, the construct validity of the concept of performance is evaluated, data are collected through a survey and analysed with the statistical method of structural equation modelling. Measures of network performance are collected into three mains streams according to the literature conceptualizations and measures, and the thesis investigates the possibility of integrating these different concepts into a unitary construct of network performance. The empirical setting for our survey is the same as in the first step. At this stage, a survey collecting the perceptions of network participants in terms of network results is implemented, according to the article "To wind a skein into a ball: exploring the concept and measures of public network performance".

3. The last stage uses the preliminary results of the first phase in terms of relations between performance determinants and network outcomes and the resulting conceptualization and measures of network performance in the second step. A survey is conducted among the overall population of public networks for the provision of homecare assistance in Switzerland. It investigates the effect of three main predictors of network performance on network results (namely, governance forms, coordination mechanisms and managerial roles), according to the article *"Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles"*. Using structural equation modelling, the causal relationships between network performance and its determinants are tested. The first step of the thesis supports the hypothesized causal relations while the second step is important for measuring network performance.

FIGURE 3. *The three phases of the sequential exploratory strategy*
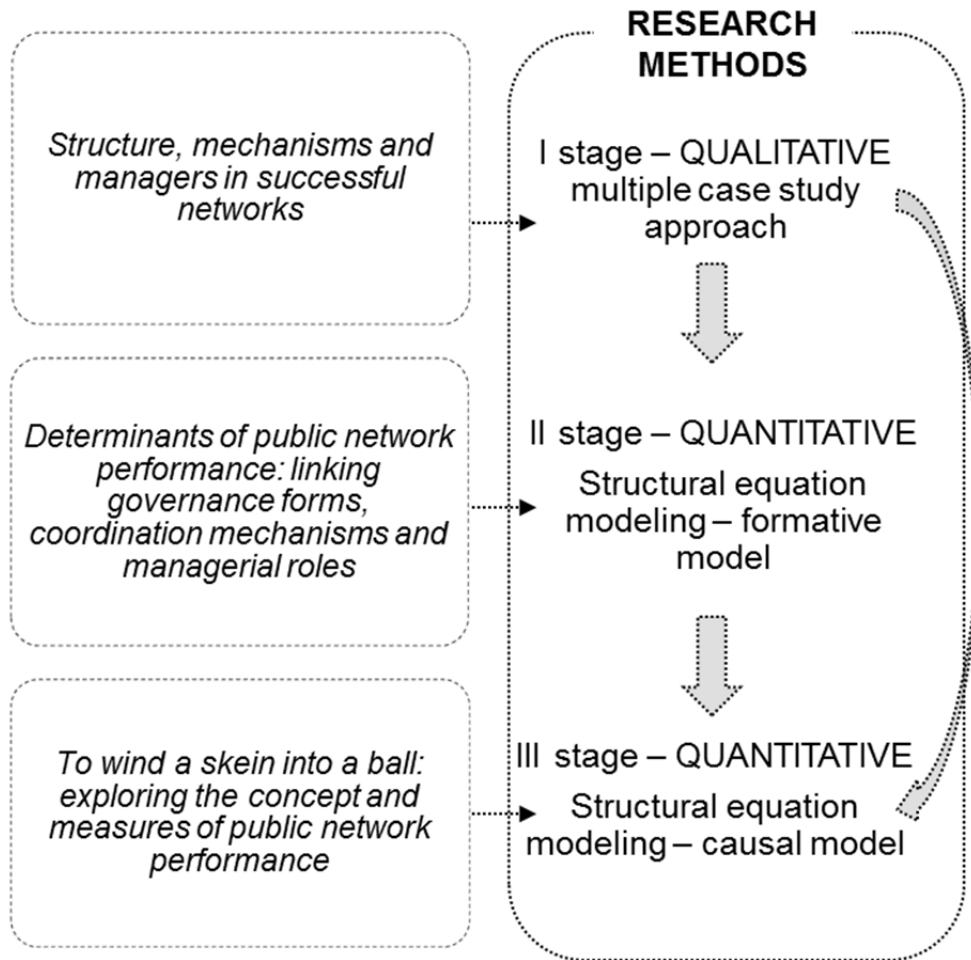
Coherently with the following steps, the sequential exploratory strategy developed hereby is based on the characteristics summarized below (Table 1).

TABLE 1. *Mixed Method Approach: strategies*

Timing	Weighting	Mixing	Theorizing
Sequential – qualitative first	Equal	Connecting	Explicit

In order to explore and better understand the topic, qualitative data are first collected. Thereafter, to expand understanding and generalize results, other data are gathered from additional people. The weight given to the qualitative and quantitative methods is equal because the dissertation uses both a deductive and inductive approach: on one hand, it sets out from the theoretical model of network determinants developed by Turrini et al. (2010) and investigates the relations among them. On the other hand, it

develops a first exploratory model of network performance. The qualitative and quantitative databases are kept separate yet linked since the results of each step are important for the definition of later steps. Finally, the theoretical framework underlying the overall thesis is explicitly presented.

The sequential exploratory strategy has many benefits and drawbacks (Creswell 2009: 212). It is useful to explore and explain (as what we did in our first and third article) a phenomenon and is suitable for developing and testing new measurement instruments (as in our second article). It requires a great deal of time to be developed and key decisions on relevant findings of the qualitative phase must be addressed.

References

Agranoff, R. and McGuire, M. (2001). Big questions in public network management research. *Journal of Public Administration Research and Theory, 11*(3), 295-326.

Agranoff, R. and McGuire, M. (2003). Inside the matrix: Integrating the paradigms of intergovernmental and network management. *International Journal of Public Administration, 26*(12), 1401-1422.

Bardach, E. Can network theory illuminate interagency collaboration? *Workshop on Network Analysis and Innovations in Public Programs,*

Berry, F. S., Brower, R. S., Choi, S. O., Goa, W. X., Jang, H., Kwon, M., et al. (2004). Three traditions of network research: What the public management research agenda can learn from other research communities. *Public Administration Review, 64*(5), 539-552.

Bevir, M. and Rhodes, R. (2003). *Interpreting British governance* (London ed.) Routledge.

Borzel, T. A. (2011). Networks: Reified Metaphor or governance panacea? *Public Administration, 89*(1), 49-63.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). London: Sage.

Evan, W. M. (1966). The Organization set: Toward a theory of interorganizational relations. In *Approaches to organizational design*, edited by James D. Thompson. Pittsburgh: University of Pittsburgh Press.

Ferlie, E., Hartley, J. and Martin, S. (2003). Changing public service organizations: Current perspectives and future prospects. *British Journal of Management, 14*, S1-S14.

Huang, K., and Provan, K. G. (2007). Structural embeddedness and organizational social outcomes in a centrally governed mental health services network. *Public Management Review, 9*(2), 169-189.

Human, S. E. and Provan, K. G. (2000). Legitimacy building in the evolution of small-firm multilateral networks: A comparative study of success and demise. *Administrative Science Quarterly, 45*(2), pp. 327-365.

Isett, K. R., Mergel, I. A., LeRoux, K., Mischen, P. A. and Rethemeyer, R. K. (2011). Networks in public administration scholarship: Understanding where we are and where we need to go. *Journal of Public Administration Research and Theory, 21*(suppl 1), i157-i173.

Keast, R. L. and Mandell, M. (2009). The impact of institutional, instrumental and interpersonal underpinnings on network dynamics and outcomes.

Kenis, P. and Provan, K. G. (2006). The control of public networks. *International Public Management Journal, 9*(3), 227-247.

Kickert, W. J. M., Klijn, E. H. and Koppenjan, J. F. M. (1997). *Managing complex networks*. London: SAGE.

Klijn, E. (1996). Analyzing and managing policy processes in complex networks: A theoretical examination of the concept policy network and its problems. *Administration and Society, 28*(1), 90.

Klijn, E. (2008). Governance and governance networks in Europe. *Public Management Review, 10*(4), 505-525.

Lindencrona, F., Ekblad, S. and Axelsson, R. (2009). Modes of interaction and performance of human service networks. *Public Management Review, 11*(2), 191-215.

Lipnack, J. and Stamps, J. (1994). *The age of the network: Organizing principles for the 21st century*. Essex Junction, VT: OMNEO.

Mandell, M. P. (1988). Intergovernmental management in interorganizational networks: A revised perspective. *International Journal of Public Administration*. 11(4): 393-416.

Milward, H. B. and Provan, K. G. (1998). Principles for controlling agents: The political economy of network structure. *Journal of Public Administration Research and Theory: J-PART, 8*(2), 203-221.

Milward, H. B. and Provan, K. G. (2000). Governing the hollow state. *Journal of Public Administration Research and Theory, 10*(2), 359-380.

Osborne, S. P. (2006). The new public governance? 1. *Public Management Review, 8*(3), 377-387.

O'Toole, L. J., Jr. (1997). Treating networks seriously: Practical and research-based agendas in public administration. *Public Administration Review, 57*(1), pp. 45-52.

Pollitt, C. and Hupe, P. (2011). Talking about government. *Public Management Review, 13*(5), 641-658.

Porter, D. O. (1980). *Accounting for discretion and local environments in social experimentation and program administration: Some proposed alternative conceptualizations.* Austin Texas: Lyndon B. Johnson School of Public Affairs.

Provan, K. G., Fish, A. and Sydow, J. (2007). Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management, 33*(3), 479-516.

Provan, K. G., Huang, K. and Milward, H. B. (2009). The evolution of structural embeddedness and organizational social outcomes in a centrally governed health and human services network. *Journal of Public Administration Research and Theory: J-PART, 19*(4), 873-893.

Warren, R. L. (1967). The interorganizational field as a focus for investigation. *Administrative Science Quarterly,* 12(3): 396-419.

Zald, M. N. (1967). Organizations as policies: An analysis of community organization agencies. *Social Forces*, 2: 56-65.

Structure, mechanisms and managers in successful networks*

Abstract

Since public networks became widespread, doubts have arisen over how to make them succeed. Scholars have traditionally addressed the issue in different ways, thus variously shedding light on the network structure, mechanisms or managers as predictors of the network performance. The aim of our paper is to explore the possibility of an interaction effect between the abovementioned factors. Our results show that there may be a relationship between network structure, mechanisms and managers that jointly affects network performance. Therefore, important suggestions can be made about how to manage public networks successfully: (1) ensure that your network mechanisms and managerial abilities are coherent with the structure of your network; (2) if you are in a well-established and integrated network, allow yourself some flexibility. Data were collected through a multiple-case study that focused on collaboration for joint provision of home care services in Switzerland.

1. Introduction

Public networks have now become widespread, due to the view that they are the most appropriate organizational form for solving "wicked" public problems (Provan and Milward 1995; Ferlie and Pettigrew 1996; O'Toole 1997; Agranoff and McGuire 1998; Keast et al. 2004; Ferlie et al. 2011). In the short time since this happened, doubts have quickly arisen over how to make them succeed (Agranoff and McGuire 2001a; Mandell 2001; Provan and Milward 2001; McGuire and Agranoff 2011).

Scholars have traditionally addressed the issue in different ways (Turrini et al. 2010). Some have focused on the need to pay attention to the configuration of the network structure for collaboration (Provan and Milward 1995; Provan and Sebastian 1998; Huang and Provan 2007). Others have concentrated on the mechanisms facilitating partner interaction (Klijn 1996; Kickert et al. 1997; Agranoff 2003), while others still have focused on the abilities that the so-called "network manager" (or network managers as Klijn et al. 2010 showed) is expected to own in order to nurture and steer the network successfully (Kickert et al. 1997; Agranoff and McGuire 2001b; 2003; Meier and O'Toole 2001; McGuire 2002; O'Toole and Meier 2004).

Within this plethora of studies, what is missing is an attempt to explore "whether an interaction effect between the abovementioned factors can be supposed, as the effect of each predictor might be mediated or moderated by others, and thus might affect network performance", to recall Turrini et al. (2010: 546).

Starting to explore this possibility is the aim of our paper. More specifically, by taking the article by Turrini et al. (2010) as theoretical framework, our paper intends to explore whether, given the context, it might be supposed that there is a relationship between the network structure, mechanisms and manager (or managers) that jointly affects network performance. That is the research question leading our study.

For this purpose, we conducted a multiple-case study. We focused on five successful networks for home care assistance in one Swiss Canton. Four of them have a centrally integrated structure, while the other has a structure that is strongly integrated into overlapping sub-groups (a multi-centrally integrated structure).

The comparison between the two blocks of cases suggests that, in order for public networks to succeed, different network mechanisms and managerial abilities can be useful, depending on the characteristics of the network structure. In particular, our

findings seem to suggest that: whereas in well-integrated and centralized networks success seems to depend on the presence of a network manager leading people who are capable of acting beyond the boundaries of rules and procedures, in multi-centrally integrated networks, success appears to depend on the ability to follow the existing rules and procedures and to share responsibilities among multiple network "administrators" (as defined below).

The results of our study thus provide significant contributions on both a theoretical and a managerial level. Firstly, they allow the supposition that there is a relationship between the network structure, mechanisms and manager(s), thus revealing a possible joint effect on network performance. Secondly, they seem to suggest that there are a number of "best ways" to achieve network success, depending on the various configurations of the abovementioned factors, rather than just one "best way" of going about it. In particular, different network structures seem to require different mechanisms and managerial abilities in order to be successful. Thirdly, the results highlight the importance of the personal relationships between the people in the partner organizations as powerful integration and coordination mechanisms, at least in centrally integrated networks. Fourthly, they question the importance of the network manager(s) (as traditionally defined) in network success and suggest that no network manager(s), or better, the sharing of responsibilities among multiple network "administrators" might be preferable, at least in multi-centrally integrated networks. On top of all this, our study gives significant suggestions about how to manage public networks successfully: (1) ensure that your network mechanisms and managerial abilities are coherent with the structure of your network; (2) if you are in a well-integrated and centralized network, ensure that you are flexible and enjoy the benefits of this approach.

The paper is structured in four sections. The first section reviews the extant literature on the predictors of network success and outlines the theoretical framework of our study. The second section describes the method and presents the background of the study. The third section summarizes the main findings of the study and the final section discusses them. At the end, the limits of the study are discussed and some suggestions are provided for further research in the field.

2. Literature review

Since the seminal work of Provan and Milward in 1995, tens of studies have focused on network performance (Kenis and Provan 2009; for a review see Turrini et al. 2010), in search of an explanation for its predictors.

Following the example of Turrini et al. (2010), below we will group these predictors into four main categories, dealing with network context (Provan and Milward 1995), structure (Provan and Milward 1995; Provan and Sebastian 1998; Huang and Provan 2007), mechanisms (Klijn 1996; Kickert et al. 1997; Jennings and Ewalt 1998; Mitchell et al. 2002; Agranoff 2003) and manager(s) (Kickert et al. 1997; Agranoff and McGuire 2001b; 2003; Meier and O'Toole 2001; McGuire 2002; O'Toole and Meier 2003).

Network context. Extant studies show that there are two characteristics of the external environment that affect network performance: environmental stability or lack thereof (including resource munificence and cohesion and support from the broader community) and external controls. As far as environmental stability or instability is concerned, Provan and Milward (1995) show that resource munificence weakens the performance of public networks unless they are highly integrated. However, other studies illustrate that the availability of local financial resources has a direct, positive effect on network outcomes, such as the quality of services (Conrad et al. 2003), capacity for achieving stated goals (Agranoff and McGuire 1999, 2001 a)b); Mitchell et al. 2002; Bazzoli et al. 2003; Shortell et al. 2002), overall community welfare (Fawcett et al. 2000), and improved access to public services (Conrad et al. 2003). Extant studies also show that a positive relationship seems to exist between cohesion and support from the broader community and network performance (Mitchell et al. 2002; Hasnain-Wynia et al. 2003; Zacocs and Edwards 2006).

As far as external control is concerned, the current literature shows its positive impact on network performance. In particular, Provan and Milward (1995) and O'Toole and Meier (2004) focus on mechanisms by which the State exercises fiscal control on local systems and find that direct, centralized and non-fragmented external control leads to better performances, or moderates the negative effect of structural network characteristics. Similarly, Mitchell et al. (2002) and Bazzoli et al. (2003) focus on the role played by state regulatory agencies, and shed light on their ability to influence the

achievement of network goals, but do not identify the precise direction of this relationship.

Network structure. A large amount of literature focuses on the relationship between the structural characteristics of public networks and their performance. More specifically, extant studies focus on factors including network integration and centralization, and network size and composition.

By investigating mental care networks in four large American cities, Provan and Milward (1995) show the positive impact of centrally integrated network structures (networks integrated around a central core agency) on network performance. In a subsequent study, Provan and Sebastian (1998) question the relationship between network integration and network performance and show that densely integrated networks do not necessary achieve good performances, unless they can count on the presence of strongly integrated and overlapping subgroups (clique overlap) to provide services within it, thus leading one to suppose that multi-centrally integrated network structures (or networks strongly integrated in a number of overlapping subgroups) have a positive effect on network performance. In a study from some years later, Huang and Provan (2007) also show that network centrality is related to better performances in terms of trustworthiness, reputation and influence.

Additionally, previous studies show that a relationship exists between both network size and network composition (in terms of heterogeneity of the network partners) and network performance (Brown et al. 1998; Mitchell et al. 2002; Hasnain-Wynia et al. 2003; Zacocs and Edwards 2006). The direction of this relationship is not determined in the existing literature, although Hasnain-Wynia et al. (2003) find that the larger the network, the lower the degree of its perceived effectiveness, and Brown et al. (1998) determine that in order to achieve higher levels of network performance it is necessary to cap the number of network members.

Network mechanisms. In management and public management literature, many scholars have showed the existence of a relationship between network mechanisms and performance (Grandori and Soda 1995). In the following, we will define network mechanisms as formalized instruments and tools normally employed to sustain partner interaction, and categorize them into three main groups: integration, coordination and control mechanisms.

As far as integration mechanisms are concerned, a positive relationship seems to exist between network performance and such mechanisms as: shared information and communication systems (Klijn 1996; Jennings and Ewalt 1998; Provan and Sebastian 1998; Mitchell et al. 2002; Agranoff 2003), joint staff activities (like marketing, funding and planning) (Jennings and Ewalt 1998; Shortell et al. 2002; Bazzoli et al. 2003), and linked roles and units (such as joint, one-stop operations to integrate the service capacity for clients) (Jennings and Ewalt 1998; Conrad et al. 2003).

Furthermore, the relationship between coordination mechanisms (such as the organization of meetings, definition of agendas, and establishment of procedures for partner interaction and decision-making processes) and network performance also seems to be positive (Brown et al. 1998; Jennings and Ewalt 1998; Mitchell et al. 2002; Lindekrona et al. 2009).

Last but not least, control, accountability and transparency mechanisms (i.e. regular external communication about rates of community social change) also seem to have a positive effect on network performance (Fawcett et al. 2000).

Network managers. Only recently, public management scholars have shown the importance of the presence of one or more network managers for network success. Following Klijn et al. (2010), for network manager(s) we mean those who "initiate and support interaction among members, solve and manage conflict and changes, lead the network to its goals and mission, build trust and commitments", by selecting and making use of appropriate managerial mechanisms. Typically, those actors are labelled as network facilitator, mediator and leader, depending on the abilities they exhibit in support of their role (Kickert et al. 1997; Agranoff and McGuire 2001b, 2003; McGuire 2002).

In particular, network facilitators are those who create (and redefine, if necessary) an institutional environment to favour and sustain partner interaction (Kickert et al. 1997; O'Toole 1997a; Agranoff and McGuire 1998a, b; Hageman et al. 1998; Weiner et al 2000; Agranoff and McGuire 2001a, b; Koopenjan and Klijn 2004; O'Toole and Meier 2004a): "the facilitator focuses almost entirely on process, makes sure meeting places and times are agreed upon, sees that meeting space is arranged appropriately, and ensures that notes and minutes of the meeting are kept… facilitators monitor the quality

of the dialogue and intervene with questions designed to enhance understanding" (Sussikind and Cruikshank, 1987: 152).

The presence of network mediators also normally aids network success, by being them able to solve tensions among partners through bargaining and negotiation (Kickert et al. 1997; Shortell et al. 2002; Bazzoli et al. 2003). More specifically, mediators are those who operate in critical situations and reconcile or restructure existing network relations: they catch and collect resources necessary to conflict solution, create a neutral setting for contrasting members, explore and suggest solutions (Kickert et al. 1997).

Last but not least, as far as network leaders are considered, extant studies shed light on the positive relationship between network performance and the presence of leaders as those who are able to plan actions (action planning) (Agranoff and McGuire 1998a, b); activate actors and resources for the network, (activating) (Klijn 1996; Agranoff and McGuire 2001a, c); mobilize the network members and build consensus and commitment to the common purpose of the network (mobilizing) (Agranoff and McGuire 2001a; McGuire 2002; Mandell and Keast 2006). More specifically, "action planning" involves the ability to establish clear missions and develop focused strategies and interventions, for the network and for the organization in which the leader works (Agranoff and McGuire 1998; Mitchell et al. 2002; Page 2003); it involves also the ability to adjust and reposition the network objectives in case of changes in the external environment. According to Kickert et al. (1997: 47), "activating" refers to the "the activation of links in a network" and to "the nature and the amount of information which need to be sent through these links". At the same time, Agranoff and McGuire (2001a: 298) state that activating "includes the process of identifying participants for the network and stakeholders in the network as well as tapping the skills, knowledge and resources of these persons". Last but not least, "mobilizing" refers to the ability to motivate, inspire and induce commitment among and network members: "managers build support for the network by mobilizing organizations and coalitions, and by forging an agreement on the role and scope of network operations. Additionally, the ability to manage networks is related to the internal support and cooperation of the manager's primary organization." (Agranoff and McGuire 2001a: 300).

As shown by the above considerations, the extant literature provides useful insights on how to make public networks really work. Nevertheless, it is in danger of only

providing a partial sketch of the phenomenon, as it tends to neglect the potential interaction effects between single factors, whereas the effect of each predictor might be mediated or moderated by others, with a consequent impact on network performance (Turrini et al. 2010). Investigating this, using the usual statistical techniques, is the aim of a broad, ongoing research project in which we are currently involved.

3. Methodology

In the framework of the aforementioned research project, the current paper represents an attempt to explore whether there may be relationships between network structure, mechanisms and manager(s) that jointly affect network performance. In particular, we are interested in understanding whether, given the context, different network mechanisms and managerial abilities might be necessary for network success, depending on the network structure. The aim is to lay the foundations for formulating propositions and hypotheses that will be tested in the ensuing research project.

To this end, given the exploratory nature of the scheme, we conducted case study research (Yin 1984). In order to reinforce our findings, we chose to conduct a multiple-case study (see Methodological Appendix for details), as a strategy for comparison and replication which could be used to identify common patterns and testable results (Yin 1984, Eisenhardt 1989).

Research Design and data collection

We focused on the six networks that the municipalities in one Swiss Canton (Canton IT) have set up to provide home care assistance to the elderly in particular, and anyone else who finds that their daily routine has become challenging (e.g. young mothers, babies and young people). We will label them "Spitex networks", for reasons that are explained below.

We focused on Switzerland as it represents an information-rich case as far as collaboration between public, private and non-profit organizations is concerned (Steiner 2003). Due to the small size of the Swiss municipalities (only ten of the 2,516 municipalities have more than 50,000 inhabitants), collaboration for the provision of public services is, in fact, a popular approach in the country: more than 60% of the Swiss municipalities are involved in networks for the joint provision of public services (Steiner 2003). We chose then to focus on home care assistance, as health and social

care is one of the fields in which collaboration is most widespread, with 69% of the Swiss municipalities involved in such networks (Steiner 2003).

Secondly, we chose to focus on Canton IT for many reasons. Swiss Cantons are autonomous States within the Swiss Confederation which can have different legislations and approaches. Therefore, by focusing on only one Canton, and according to the purposes of our study, we could keep the context as given, as far as both environmental uncertainty and external control is considered. In Canton IT, in fact, the Cantonal Government and the individual municipalities contribute 55.4% of the funding for the activities of all Spitex networks (on average), and external control is jointly exerted by the Cantonal Government (Financial Department and Health Department) and the insurance companies in all six networks. We also chose to focus on Canton IT as it is a singular case. As is better explained below, all six networks that provide home care assistance in the Canton are success stories compared with the Swiss average. Last but not least, as is usual in qualitative analysis with its labour-intensive nature, proximity and case accessibility were also important criteria in the case selection process (Patton 1990).

Thirdly, we chose to focus on the six networks that provide home care assistance in Canton IT for two reasons. First of all, they are success stories compared with the Swiss average (see the following paragraph and Table 3 for details) ("extreme case" criterion for case selection, Patton 1990). Secondly, as our previous studies showed (Cristofoli, Macciò and Sancino, 2011), the Spitex networks in Canton IT have different network structures. Some of them are centrally integrated (homogeneity criterion for case selection, Patton 1990) and others are multi-centrally integrated (heterogeneity criterion for case selection, Patton 1990), as is better explained below and shown in Figure 1. They were also similar in terms of size and degree of heterogeneity (Table 3).

In this way, by sticking to the context as it was, our research design allowed us to explore, in special and information-rich cases, the existence of a relationship between the network mechanisms and manager(s) and the network structure in success networks. In particular, the homogeneity criterion allowed us to look for confirmation of the emerging results within a group of similar cases; the heterogeneity criterion allowed us to test these results in a very dissimilar case.

Data were collected in a two-step procedure. Firstly, semi-structured interviews (Denzin and Lincoln 1994) were conducted with all of the key players in the organizations involved in the networks being considered. At least one person from each partner organization was interviewed. In some cases, more than one person from the same organization was interviewed, in order to give a better idea of how the network functions. Table 1 lists the number of interviews conducted for each network. In total, 73 interviews were conducted. Although they were quite open, the interviews were structured into four sections: network partners, in order to identify the organizations involved in the Spitex network and the relationships between them; network mechanisms, in order to appreciate the presence and actual use of the existing mechanisms for partner interaction; network manager(s), in order to identify the presence of one or more network managers and understand the abilities that these figures own; and finally, some questions about the interviewees' perception of their network's performance were also asked. Most of the interviews were conducted by at least two researchers, with one asking questions and the other taking notes. They were also typed and transcribed within the next 24 hours. Some phone interviews were also performed in order to better explore or clarify what emerged in the face-to-face interviews. According to the method suggested by McCracken (1988) for in depth interviews, each interview took about 45-60 minutes. Once the first round of data collection had been concluded, a questionnaire was also given to the contact person for each network partner (as is better explained below), with the aim of collecting the data required to map out the network structure.

Network mechanisms were appreciated in terms of presence and actual use of formalized integration, coordination and/or control instruments and tools to sustain the partner interaction. More specifically, the interview questions contained a list of integration, coordination and control mechanisms (as emerging from the extant literature) and people were asked whether they used those mechanisms to interact with network partners. Similarly, network manager(s) were appreciated in terms of presence of one or more actors playing the role(s) of network facilitator, mediator and/or leader. More specifically, the interview questions contained a list of abilities the extant literature identifies as typical of the network facilitator, mediator and leader, and people

where asked whether they can recognize one or more actors owing them. The measure used to assess the network performance is better explained below.

Data were analysed in a three-step procedure: storing, managing and processing (Miles and Huberman 1984). First of all, we grouped data into three categories: network structure, mechanisms and manager(s). Secondly, taking our lead from the extant literature, we identified single variables within each category, and then looked for relationships between them. In this way, we were able to look for interaction between the predictors of network performance that have been identified by the extant literature. To ensure that the qualitative analysis was reliable (Denzin 1978, Denzin and Lincoln 1994), we first triangulated the sources and then used the researchers' triangulation results and arranged meetings to discuss the data with our colleagues and interviewees.

TABLE 1. *List of interviewees**

	Spitex-White	Spitex-Brown	Spitex-Black	Spitex-Red	Spitex-Indingo
Spitex					
Director	1	1	1	1	2
Health Care Director	1	1	1	1	1
Financial Director	-	1	-	1	-
Team Leader	1	2	1	2	1
Nurses/Social workers	1	1	1	1	-
Municipalities					
President of Executive Committee	1	1	1	1	3
Non-profit/Partner organizations	7	8	6	8	8
Cantonal Government	1	1	1	1	1
Total	**13**	**16**	**12**	**16**	**16**

* We initially intended to interview a representative of each municipality, but they did not seem to be very well informed about Spitex activities, so in the end we only decided to interview the representatives of the municipalities on the Executive Committee.

4. Empirical setting and case selection: the Spitex networks

The term "Spitex" is derived from the German words "Spital" and "extern". It refers to health and medical care that is provided outside hospital environments. The idea behind Spitex systems is that patients should be treated, supported and advised as much as possible by specially trained nurses, social workers and doctors outside the hospital and in a familiar setting (their home), so as to increase their comfort, autonomy and self-determination.

With this objective in mind, at the end of 1990 the Swiss Confederation and Cantons induced municipalities to work together to provide health and social care services for people in their homes. As a result, Swiss municipalities jointly set up specific organizations for home care assistance in forms such as consortia, foundations and associations. We will label them Spitex organizations. They normally provide some services for home care assistance on their own, and activate other private and non-profit organizations for ancillary and complementary services (such as transportation of disabled people, meal services for those unable to cook, night care, oncological care, psychological support, etc. etc.), each of which has its own capabilities and specializations. A list of these organizations is provided in Table 2. In this way, public networks (or Spitex networks in our parlance) are formed. They are made up of three kinds of network partners: municipalities and the Cantonal government; the Spitex organization (either as an administrative organization activating and coordinating interaction between partners, or an operational organization providing basic services); and private and non-profit organizations for the provision of complementary services.

Normally, Spitex organizations are governed by an Assembly, with representatives from each partner municipality, an Executive Committee of Assembly representatives, and two directors (one responsible for managing the association and one responsible for managing professionals such as nurses, social workers and medical doctors). They also have multitasking teams of professionals who are responsible for providing home care services in specific geographical areas. As a rule, the Spitex organizations are contacted by medical doctors requiring care for their patients. The physicians' requests are jointly evaluated by Spitex experts, and, on the basis of this assessment: a package of home care services will be put together for each client, and specific organizations will be contacted to provide complementary services, if necessary. Normally, Spitex organizations are funded by the Cantonal Government (which also controls their activities), as well as by municipalities, donors and fees paid by patients, in percentages which vary from Canton to Canton.

For the purposes of our analysis, we looked at five of the six Spitex networks operating in Canton IT. One of them (namely Spitex-3) did not agree to participate in our analysis. In order to preserve their anonymity, we will refer to the networks as Spitex-White, Spitex-Brown, Spitex-Black, Spitex-Red, and Spitex-Indingo.

TABLE 2. *List of partner organizations*

	Description of the activity
AT	Provision of home help services including basic household tasks such as cleaning, cooking and shopping
CRS	Provision of transport services
HPC	Provision of oncological care
LCR	Provision of oncological assistance at patients and their families
OP	Provision of home help services including basic household tasks such as cleaning, cooking and shopping
PNF	Provision of home help services including basic household tasks such as cleaning, cooking and shopping at disabled people
PSN	Provision of home help services including basic household tasks such as cleaning, cooking and shopping at elderly
TPL	Provision of transport services

As mentioned above, all of them are success stories if compared with the Swiss average (Table 3). In order to appreciate their performance, we considered the Kenis and Provan (2009) argument that there is not a universally accepted measure for network performance in public network literature, but there are many different measures that have been proposed and used by scholars (for example, see Provan and Millward 2001). Their view is that all of the measures are valid and there are no reasons to question them, as the selection of the measure is a normative choice. Thus, for the purposes of this paper, we followed the lead of Provan and Milward (2001) and Kelman et al. (2011) and focused on "changes in the incidence of the problem" brought about by Spitex activity as a measure for network performance. In particular, we focused on the ratio between the number of Spitex network patients and the total population of the geographical area in which the Spitex operates. According to the federal Spitex Association, which establishes guiding principles for every Spitex network in Switzerland, in fact Spitex networks should aim to ensure that patients are treated for as long as medically possible in their familiar environment; in this way, the costs of stays in hospitals and nursing homes should be reduced and the quality of life for patients should be increased (Spitexverband 2011). Accordingly, the higher the ratio we proposed, the greater the problem-solving capability of the Spitex network should be. Indeed, an increase in the number of patients that it serves will lead to a decrease in the number of people being treated in nursing homes, hospitals or other stationary facilities, giving a significant improvement to their quality of life. As Table 3 shows, all of the Spitex networks in the Canton have a patients/inhabitants ratio that is above the Swiss

average, so they are all performing well. The data were gathered from the 2010 Federal and Cantonal Statistical Offices. They are corroborated by the results of a report from the Cantonal government that states that all of the Canton IT networks successfully complied with the established requirements in terms of quality and efficiency (no networks have had a deficit in the last ten years).

As shown in our previous study (Cristofoli, Maccio' and Sancino, 2011) and shown by Figure 1, the five networks have different structures. We used a three-step procedure to gain an understanding of these structures. Firstly, on the basis of the interviews with the employees of the Spitex organizations, we identified the network partners and drew up a list of them for each Spitex. The boundaries of each network were thus established. We then gave a questionnaire similar to the one proposed by Provan et al. (2005) to one person (the contact person) from each partner organization included in the list. Thirdly, we used the relationships between the members of the list, as described in the questionnaire, to map out the network structure. In accordance with social network analysis techniques (Scott 1991), and following the lead of Provan and Milward (1995), Provan and Sebastian (1998) and Provan et al. (2005), we then used three measures to gauge network integration and centralization, namely network density (for the integration), betweenness (for the centrality) and clan (for the existence of integrated subgroups). We used UCINET to calculate the network measures and Netdraw to create the network maps (Figure 1).

TABLE 3. *Public network characteristics and performance*

	Spitex-White	Spitex-Brown	Spitex-Black	Spitex-Red	Spitex-Indingo	**Swiss average**
<u>Size</u>						
No. of partners	26	42	32	41	57	
<u>Homogeneity</u>						
No. of municipalities	17	32	24	29	38	
No. of non-profit organizations	7	8	6	10	16	
<u>Structure</u>*	Centrally integrated	Centrally integrated	Centrally integrated	Centrally integrated	Multi-centrally integrated	
Density	0.5169	0.633	0.6331	0.5854	0.5154	
Betweenness						
Spitex organization	153.833	309.333	178.667	331.333	472.100	
Org2**	1.83 (PSN)	6.33 (PSN)	2.33 (PSN)	2.33 (PSN)	393.100 (Spitex-V)	
No. of clan2,3	1	1	1	1	2	
Performance* **2003**	**2.00**	**1.79**	**3.23**	**1.83**	**2.00**	**2.6%**
2010	**3.42**	**3.01**	**4**	**3.23**	**3.4**	**2.7%**

* Density – overall level of connectedness between organizations in the network; Betweenness - organizations most central or most involved in the network; – Clan2,3 existence of subgroups of three or more fully interconnected organizations (path equal to 2 minimum) (Provan et al. 2005)

** Parenthesis indicate the name of the second ranked organizations.

*** Network performance is the ratio between the number of Spitex network patients and the total population of the geographical area in which the Spitex operates.

As shown by Figure 1, according to our analysis, four networks (namely Spitex-White, Spitex-Brown, Spitex-Black and Spitex-Red) have a centrally integrated structure based around a core agency (i.e. the Spitex organization entrusted with providing home care services and activating other organizations for this purpose if necessary), while the other one (Spitex-Indingo) has a multi-centrally integrated structure (or structure integrated around two central actors). In the latter case, it is in fact possible to see two distinct subgroups of integrated organizations, each with its own core agency performing coordination tasks for its own "sub-networks". This is because Spitex-Indingo is the result of a merger between two previous Spitex networks operating in different geographical areas: Spitex-I and Spitex-O. After the merger, Spitex-O no longer had an autonomous legal status, but it was recognized as

autonomous for the purposes of service provision. The relationships between Spitex-I and Spitex-O are regulated by a contract and, although the governance structure is the same, both Spitex-I and Spitex-O are run by a Director, they maintain a direct relationship with the municipalities that they serve, and they enjoy a high degree of autonomy and independence when activating their respective partners. As the Director of Spitex-O said: "*Thanks to the contractual agreement, we can benefit from the collaboration without losing our independence.*"

FIGURE 1. *Structures of the five Spitex networks**
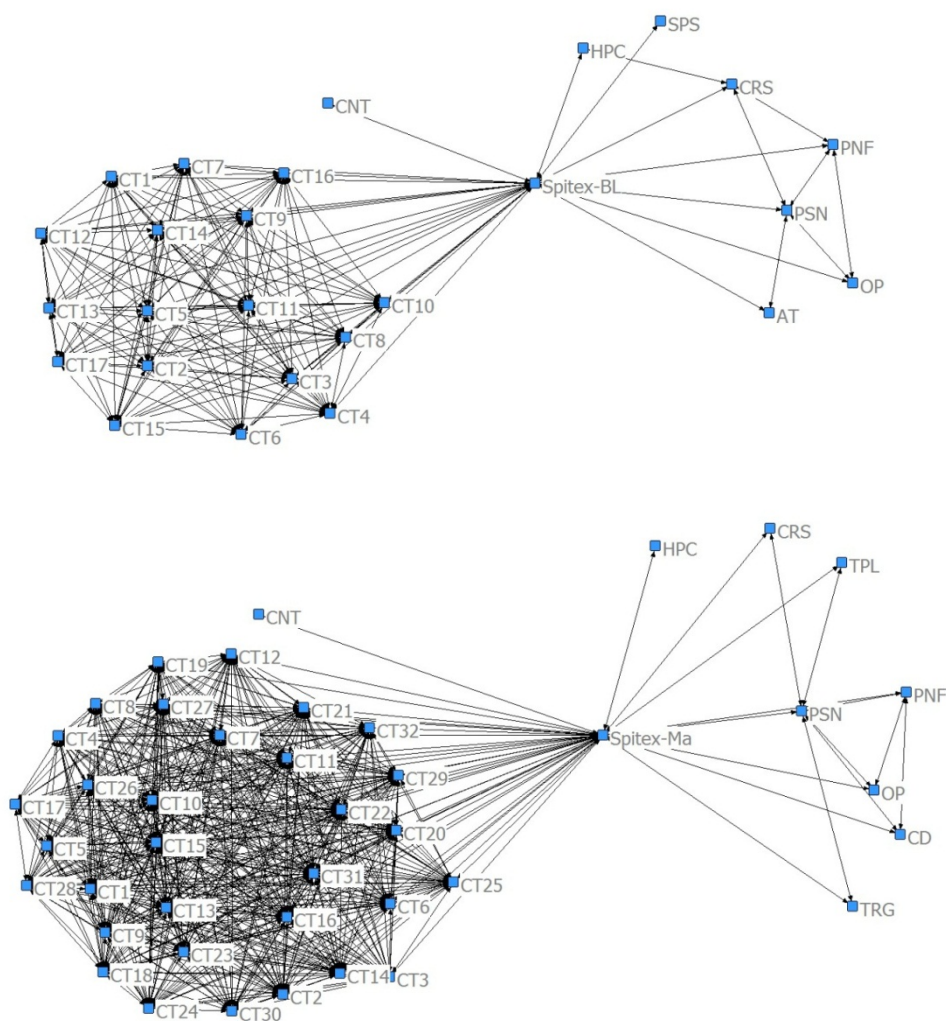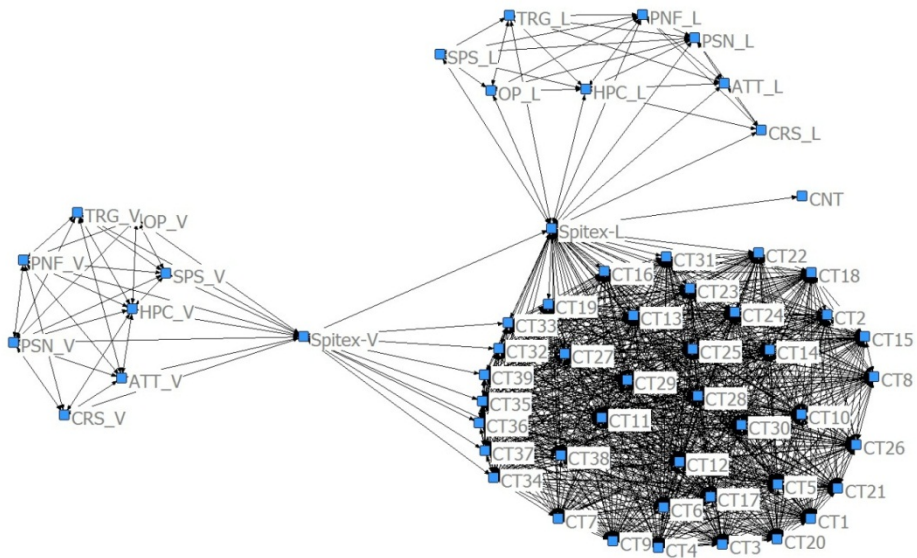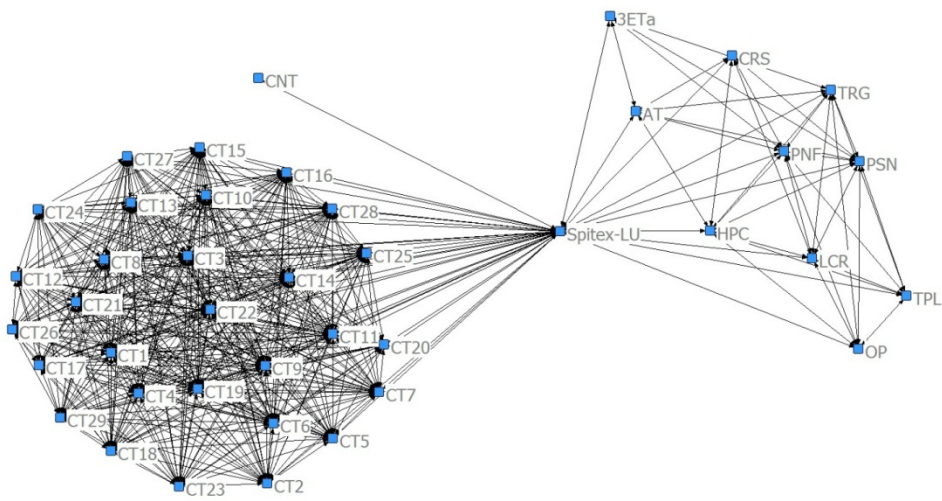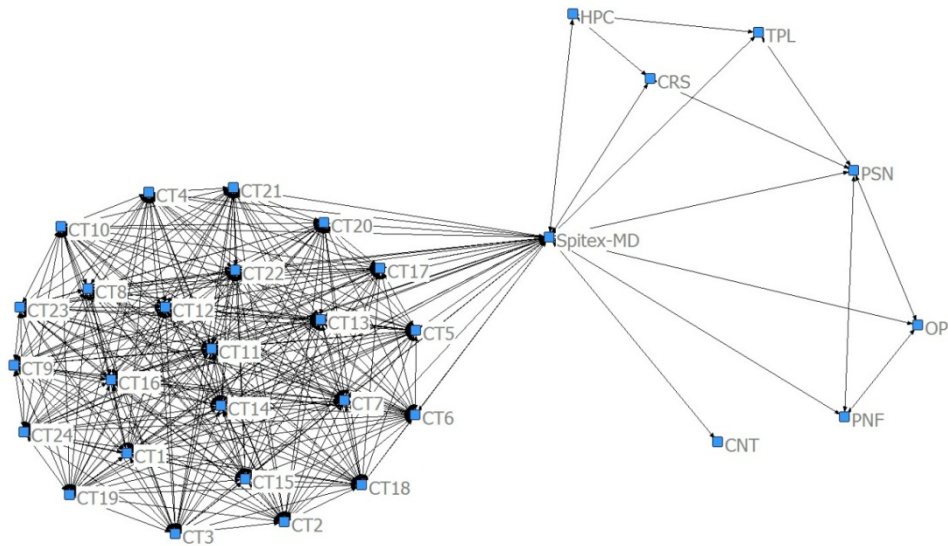
*Network relationships indicate collaborative links between the network organizations

5. Findings

Table 4 reports the results of our study.

It helps us to identify two blocks of cases, with significant differences in some aspects regarding network mechanisms, and the managerial abilities in the different network structures are in stark contrast. While, in fact, the similar cases of centrally integrated networks offer some confirmation about network mechanisms and manager(s), the multi-centrally integrated network seems to tell a substantially different story.

TABLE 4. *Study results*

	Spitex-White	Spitex-Brown	Spitex-Black	Spitex-Red	Spitex-Indingo
Network structure	**Centrally integrated**	**Centrally integrated**	**Centrally integrated**	**Centrally integrated**	**Multi-centrally integrated**
Network mechanisms					
Integration mechanisms	●	●	●	●	●
Coordination mechanisms	●	●	●	●	●
Control mechanisms	●	●	●	●	●
Personal and informal relationships	●	●	●	●	○
Network management					
Network facilitator	●	●	●	●	○
Network mediator	●	●	●	●	○
Network leader	●	●	●	●	○
Multiple network administrators	○	○	○	○	●
Network performance	**success**	**success**	**success**	**success**	**success**

Network mechanisms. As far as network mechanisms are concerned, all four centrally integrated networks seem to exhibit formalized integration, coordination and control mechanisms, but they do not seem to rely on them a great deal. Informal contacts and personal relationships between people involved in the partner organizations seem to be a more powerful mechanism to sustain and promote partner interaction.

In the *case of Spitex-White* in particular, various mechanisms were established to promote partner integration. These ranged from hosting partners within the headquarters of the Spitex organization to hiring people to act as points of contact with the network

partners, and developing shared projects and joint marketing campaigns. Nevertheless, despite this plethora of mechanisms, as the Spitex-White Director said: "*Meeting people from the partner organizations face-to-face in the same corridors every day is the most powerful integration mechanism, and this is what really makes us feel like part of a network.*" Similarly, one of the Spitex-White nurses said that she was not aware of any joint marketing campaigns, as the standard approach used by her and her colleagues is what usually works: "*When we come into contact with a new patient for the first time, we normally give a very informal presentation of all of the network partners and the services that they can provide*". On top of this, formal mechanisms also seem to exist in order to promote partner coordination. As the Spitex Director stated during our interview: "*In order to promote partner coordination, we created a special room where we meet our partners every Thursday.*" Nonetheless, according to one Spitex nurse, "*contact is informal and a daily occurrence*", while a social worker from one of the partner organizations added "*I simply pick up the telephone if I need anything*" *(PSN)*. As a figure from another partner organization explained, "*our relationships normally develop spontaneously, as a result of the patients' needs. Someone will need assistance and, depending on their requirements, we normally contact each other. In this region, practically everyone knows each other*" *(TPL).* Last but not least, various control and accountability mechanisms also seem to exist in the form of a website, reports for the Cantonal Government and municipalities, and brochures for patients and their families, although "*the most powerful control mechanism is the satisfaction of our patients,*" argued the Spitex Health Care Director.

There also seem to be a number of mechanisms to promote partner integration in the *case of Spitex-Brown*. These include joint roles and units: "*Within the Spitex, there is a special pool of oncological nurses that interact with us*" (social worker from HPC). Another example is "room sharing": "*Every other Wednesday, I normally meet people who need my assistance in the Spitex-Brown headquarters, where they give me access to a room of my own*" (social worker from PSN). There are also joint projects: "*We plan and implement projects together. This unites us and allows us to learn and grow together*" (social worker from OP). Despite the existence of these mechanisms, however, the people that we interviewed revealed that informal mechanisms are the most powerful means of integration. "*What really gives us the idea that we are working together is the*

fact that when the PSN social worker meets her patients in our building (Spitex-Brown), we take advantage of the opportunity to share ideas about patients that we have in common, as if we were part of the same organization," said the Spitex-Brown Director, thus giving one example of informal integration mechanisms. On top of it, regular meetings are then normally organized to coordinate the activities of partners (they may be weekly, monthly, or three or four times a year, depending on the activities of the network partner). However, *"besides these regular, useful meetings, our contacts are more informal and frequent. They take place as a result of specific patient needs,"* said the Spitex-Brown Healthcare Director. As was better explained by a Spitex social worker, *"normally, we contact our partners by phone or email. We KNOW that we collaborate because we have the same purpose. It is a tacit and informal agreement: we know we can count on them and they know they can count on us."* Similarly, a social worker from PSN stated: *"Normally, Spitex-Brown nurses contact me directly, whenever they need to. All of them have my mobile number."* Last but not least, in the Spitex-Brown case, there are also a number of control mechanisms to provide details of Spitex results to the Cantonal Government and the municipalities (reports), as well as the Spitex patients (brochures), but *"the most important thing is the trust that they have in what we do"* (Spitex-Brown Director).

Similarly, in the *case of Spitex-Black,* joint education activities, linked roles and marketing campaigns are normally used to promote partner integration. Nevertheless, as in the previous cases, partner integration is mainly supported by the fact that *"we know each other and share the same objectives"* (social worker from PSN). As far as coordination mechanisms are concerned, interaction between the network partners is also favoured by *"a series of scheduled meetings"*, although *"we stay in contact every day regardless of these meetings,"* explained one Spitex nurse. Then as in the previous cases, control mechanisms also formally exist, but the people interviewed do not seem to rely on them as the most powerful accountability mechanisms, because the ability to satisfy patient needs comes first.

In the *case of Spitex-Red*, partner integration seems to be supported mainly by shared information and communication systems, although there are informal mechanisms that also seem to work. The information and communication systems are especially useful for the team leaders when they are managing and coordinating the daily activities of the

professionals responsible for satisfying the needs of individual patients. A figure from one of the partner organizations maintained that "*most of the information (concerning the patients' needs) gets to us thanks to the Spitex-Red information and communication system,*" although he then acknowledged that "*a lot also gets through by word of mouth*" (CRS). Formalized mechanisms exist to support also partner coordination, although they do not seem to be the main driver of decision-making processes on a strategic and organizational level, and partner coordination does not appear to be a priority in meetings and agenda planning (which are instead driven by the patients' needs). The relationships between Spitex-Red and the organizations providing complementary services are in fact not supported by any formalized contracts: "*There are no formal agreements. The collaboration is based on a very spontaneous approach,*" said the Director of one of the partner organizations, who added that "*people do not contact each other because of written rules but due to their personal relationships*" (CRS). Last but not least, then, as is the case with the other Spitexes, Spitex-Red has accountability and control mechanisms (e.g. an updated website showing data and results, reports, brochures, and more), but the interviewees appear to consider them no more than a "*well-established formality*" and they do not heed them a great deal. "*Our goal is to communicate with our patients: we respond to THEIR questions,*" declared the Spitex Director.

The situation is very different in the *Spitex-Indingo* network. Integration, coordination and control mechanisms not only exist, they also actually support and promote partner interaction. Integration mechanisms are mainly present in the form of information and communication systems. Despite the network's fragmented structure, the Spitex-Indingo Director said: "*We are a network, and we decided to share an administration system.*" Other, less formal channels to support partner integration were never mentioned during the interviews. Unlike the other networks, Spitex-Indingo seems then to rely on formalized coordination mechanisms a great deal. No informal relationships between people were mentioned. Planned meeting and coordination instruments are seen as the best solution for "*clarifying situations or sharing a strategy*" (Spitex-Indingo Director). Regarding relationships between the network partners, interviewees constantly referred to all of the formal contracts and rules governing them. During an interview, one of the Spitex-Indingo Directors said the word "contract" fifteen times. Meetings at all levels of the network are scheduled and well planned: once

a week Spitex-Indingo representatives meet representatives of the partner organizations that provide complementary services. Five to six meetings a year take place to coordinate the activities of the team leaders. More relevant is the fact that formalized mechanisms are the key variable that regulates relationships between the two subgroups (Spitex-I and Spitex-O). As previously stated, a contract defines the connections between the two and justifies their managerial autonomy. Finally, as far as accountability mechanisms are concerned, not only do they exist, they also seem to be the most powerful mechanisms for reporting network results. In a marked contrast with the other cases, all of the Spitex-Indingo interviewees were very well informed about all of the tools and instruments used for external communication. They mentioned annual reports for the Cantonal Government, yearly reports for municipalities, brochures for citizens and patients, conferences for the presentation of future strategies and projects, and more besides.

Network manager(s). As far as the presence of a network manager(s) is considered, the same situation can be found in all four centrally integrated networks, i.e. the presence of a general director leading the central core agency and acting as a facilitator, mediator and leader. Meanwhile, once again things appear to be significantly different in the Spitex-Indingo network. It is difficult to identify the network manager: the governance and management of the network seems to be left to the existing institutional and official bodies and driven by the established rules and procedures.

In the *case of Spitex-White,* the Spitex Director seems to be able to define the rules for partner interaction, thus acting as network facilitator. "*What I normally do is weave a web within which the others can move,*" he stated. Then, as many people said, conflicts do not normally take place within the network, but the Director will intervene and try to resolve any that do arise (as mediator among multiple interests). The Spitex Director is also recognized as the network leader as responsible for planning network activities, making resources available and mobilizing the network partners. It is in fact the Director who defines the network's strategy, although he does have to get the formal approval of the Executive Committee. As the President of the Executive Committee pointed out: "*The formulation of the network's strategy is a task for the Spitex Director. It is also true that he then has to share it with the Directors of the partner organizations and the Executive Committee, but the Spitex Director is the driving force behind the Spitex*

strategy. He guides the Executive Committee." The Director also defines the network's mission, vision and values (*"I follow the principles of new public management,"* he stated), and activates and mobilizes all of the other partners around him. *"We normally share the same values. We follow the guidelines marked out by the Spitex Director: efficiency, effectiveness and economic viability,"* said the leader of one of the multitasking teams.

The Director of *Spitex-Brown* was also generally recognized as the network facilitator, mediator and leader by the interviewees. He in fact normally *"ensures that the network works, by drawing up the framework for partner interaction,"* as one figure from a partner organization stated (PSN), thus acting as facilitator. He is also the one who *"arranges meetings to solve problems in the event of conflict. That's not the responsibility of the people who work with patients,"* stated a figure from one partner organization (HPC); the Director also *"does his very best to defend our actions in front of the Cantonal Government and the municipalities"* (Spitex Health Care Director) and he is the person to go to in order *"to discuss any problems"* (Spitex Administrative Director), thus acting as mediator. Last but not least, the Spitex Director defines the network's strategy. *"When I started to work for the Spitex,"* remembered one of the Spitex Team Leader, *"it was the Spitex Director who gave me clear goals and objectives"*; the Spitex Director also promotes the idea of the network among the actors: *"There is a good network for home care assistance here, and we have the responsibility of coordinating it, as our Director has taught us"* (Spitex Team Leader), thus acting as network leader.

Similarly, *in the case of Spitex-Black*, the Director is normally identified as a facilitator (*"I have to say that in our region, the network is well developed. It is our task, as a Spitex organization, to promote, develop and maintain the network. Our Director has always worked hard to achieve this"* – Spitex Health Care Director), mediator (*"In the event of conflicts between network partners, it is normally the Director that tries to resolve matters"* – Spitex Team Leader), and leader (*"It is my job to interact with the Executive Committee in order to formulate strategies"* – Spitex Director).

The *Spitex-Red* Director also shows the ability to define and reconsider the operating rules of the network if necessary, thus acting as facilitator. For example, when faced with difficulties in implementing local commissions, which were expected to monitor the needs of patients living in different geographical areas, he relied on

informal relationships with individuals working in the areas in question: "*Originally we implemented the local commissions, as required by law, but they didn't work very well, so in order to be able to satisfy our patients' needs we preferred to rely on trustworthy people working in these areas.*" The Spitex-Red director shows also skill in dealing with the various parties in the event of disagreements, thus acting as mediator. For example, he organized meetings with staff members to ease the tension caused by some personnel dismissals, and as one team leader remembered: "*When one of the partner Municipalities said that it was dissatisfied with our services, the Director supported us and helped us to meet the Municipality representative and find a solution.*" In keeping with the existing literature, the Spitex-Red Director also acts as network leader. He in fact shows the ability to develop focused strategies and action, by engaging in participative decision-making or decision-making that facilitates interaction, especially on a Cantonal level. He said "*many decisions, especially on a Cantonal level, are made ex post. We often work on the basis of trust and word of mouth.*" He is able to activate the whole network, by "*taking emergency measures*" to satisfy the citizens' needs and "*activating single members of the Executive Committee on a personal level to deal with technical issues, if necessary*". He has the capacity to build up commitment on critical changes. "*We had no particular opposition because we all recognized our responsibilities in the community,*" was one comment, while the Financial Director said that "*it is thanks to the Director that we have a flexible and dynamic organization.*" The Spitex Director enjoys the trust and consensus of all network members. Consequently, he can intervene to solve problems even if it means bringing into play human and economic resources outside the expected channels.

The story of the *Spitex-Indingo* network is very different. Firstly, the Director, the President and the Vice-President of the Committee all act as network facilitators. Many interviewees identified this group as the real managerial apex of the network. It is able to manage and change the network operating rules if necessary, and to understand the opinions, interests and specific language of each network partner. Secondly, in the Spitex-Indingo network, tensions among partners are usually resolved by the governing bodies (the Executive Committee or Assembly) rather than the Director's Office, thus making it difficult to identify a mediator. As the Spitex Director said, "*there was some tension among the network partners about the opportunity to provide services for*

children and poor people too, but this was not a matter for the Office Director; it is a matter for politicians." Thirdly, in the Spitex-Indingo network, the ability to define the network's strategy and lead the network is shared by the governing bodies. The Director said that "*all of the strategic decisions are made by the Executive Committee,*" while the President of the Committee stated that "*the Director's knowledge of economic issues helps us to be more efficient and effective.*" Furthermore, in this case the governing bodies support the creation of commitment. They work as aggregators of interests and balance power on strategic issues discussed in the Assembly.

6. Discussion

On the basis of the findings presented above, our study seems to suggest that a relationship might exist between network structure, mechanisms and manager(s) (or better between the network centralization, the formalization of the network mechanisms and the presence of the network manager). In order to ensure network success, in fact, different mechanisms and managerial abilities seem to be necessary, depending on the network structure. In particular, whereas informal and personal relationships between the network partners seem to be important in all four centrally integrated networks, and a network manager appears to be paramount for network success, the success of the multi-centrally integrated network seems to be guaranteed by reliance on formalized rules and procedures and the sharing of responsibilities among the network's multi-organizational governing bodies. Thus, the following propositions can be formulated:

> *Proposition 1. Given the context (and all other things being equal), different structures require different mechanisms for the network success.*
>
> *Proposition 2. Given the context (and all other things being equal), different structures require different abilities to manage successful networks.*
>
> *Proposition 3. Given the context (and all other things being equal), different structures require different mechanisms and managerial abilities for network success.*

In this way, our study paves the way to new considerations about: how to ensure the network success; the importance of formal network mechanisms in successful networks; the cruciality of the network manager(s) for the success of public networks.

About how to ensure the network success, first our study goes in the direction suggested by Turrini et al. (2010) and shows that the network success can also depend by an interaction effect (mediation or moderation) among the predictors of the network performance. Different networks structures might in fact require different mechanisms and managerial abilities (or a different combination of them) in order to be successful.

Secondly, and as a consequence of this, our study seems to suggest that there are a number of "best ways" to govern and manage public networks, rather than just one "best way" of going about it, depending on the possible multiple combinations of the abovementioned factors, equally leading to good performance.

This consideration leads to a more general reflection about the convenience of taking a contingent approach at the network management, as recent studies seem to highlight (Kelman et al. 2011).

Regarding the importance of network mechanisms, the results of our study seem also to enrich the existing literature and suggest new considerations. The existing literature stresses the importance of formalized integration, coordination and control mechanisms to manage partner interaction and guarantee network success (Klijn 1996; Kickert et al. 1997; Jennings and Ewalt 1998; Mitchell et al. 2002; Agranoff 2003). Our study shows that such instruments are useful in complex networks, where the partners' different interests might make network management difficult, but also that they are superfluous in networks where the governance structure is clear and the partner integration is high. In these networks, the personal relationships between the network partners seem to offer a more efficient – and above all more effective – integration and coordination mechanism. This is in keeping with the traditional behaviour of public sector organizations, and it can be explained by considering the importance of the bureaucratic culture for them. It is well known that public sector organizations typically respond to uncertain and complex situations by establishing rules and procedures, as formalization is considered the best way to attain the final objectives without sharing the responsibilities (and risks) of achieving them. In contrast, when situations are clear and easy to manage, public sector organizations can also enjoy the benefits of being flexible.

Finally, regarding the presence of network managers, our study seems to challenge the importance of the role of the network manager and suggest some considerations

about it, coherent with the literature emphasizing that it is more the managerial actions than the persons that matters, as one anonymous reviewer suggested us. The existing literature has typically stressed the need for someone to act as a network mediator, facilitator and/or leader in order to ensure that the network is successful (Kickert et al. 1997; Agranoff and McGuire 1998; Mitchell et al. 2002). Little by little, various studies have shed light on the different skills and abilities that a network manager is expected to develop in order to manage public networks successfully. We summarized them in the literature review section. However, given the results of our study, the presence of a network manager does not always seem to be necessary for network success. The Spitex-Indingo network has been successful without a prominent network manager, or perhaps due to the presence of a number of "network administrators" in the form of institutional and official bodies, which simply run the network by ensuring that the partners' activities comply with the existing rules and procedures. These results can also be explained by considering the bureaucratic approach of public sector organizations. As is typical in the bureaucratic culture, public networks seem to prefer sharing tasks and responsibilities among numerous official actors in complex situations, whereas they appear to favour taking a managerial and entrepreneurial approach in simple ones.

These last two considerations lead to a more general reflection about the nature and characteristics of public networks. They were conceived as a new and flexible organizational form that was able to overcome the rigidity of bureaucracy, but in uncertain and complex situations, public networks seem to be managed in a bureaucratic way. Are we witnessing the bureaucratization of public networks?

7. Conclusion

The results of our study are important for both theory and practice.

From a theoretical standpoint, they enrich the existing literature on the predictors of public network performance. Firstly, they suggest the existence of a relationship between network structure, mechanisms and manager(s), with the latter aspects depending on the former. Secondly, they reveal that personal relationships between network members are another important mechanism that might affect network success. Thirdly, they seem to challenge the importance of a network manager for network success.

In empirical terms, and only as insights for public managers, our study gives important "pointers" on how to manage public networks successfully. Firstly, it shows that it is a good idea to choose network mechanisms and managerial abilities that are in keeping with the network structure (Figure 2). As in the cases examined, more integrated and centralized networks seem to have less formalized functioning mechanisms and greater centralization of power in the role of the network manager. In contrast, the less a network is centralized in one actor, the more important it seems to be to rely on formalization and power sharing. In addition, the results of our study seem to suggest that network managers in a well-established and integrated network should adopt a more flexible and informal style of governance, by neglecting formalization and relying on the relationships between people.

However, as previously stated, the paper presents the preliminary findings of a wider research project, which aims to test the joint effects of the contextual, structural, functioning and managerial characteristics of public networks on network performance. It is an exploratory study and the results require further investigation.

A few limits can in fact be identified in the current study, and they need to be resolved in order to move forward in the process.

First of all, the current research design, comparing only successful cases, allows us to suppose, with a good level of confidence, only that in successful networks there is a relationship between the network structure, mechanisms and manager(s), when the context is given. At present, we cannot go further and suppose that in centrally-integrated networks, network success is ensured by formalized coordination mechanisms and/or the presence of a network manager (and vice versa in multi-centrally integrated networks), as we do not consider the opposite situation (bad performers). This idea seems to emerge from our data; it is corroborated by all of the centrally integrated networks and public managers can be informed of it, but it requires further scientific investigation to be developed further. Multiple case studies comparing successful and unsuccessful networks should be conducted for this purpose. Quantitative studies could also be used to test this hypothesis and give generalizable results.

Secondly, our research design, as multiple case study, only allows us to hypothesize that interaction between network mechanisms and manager(s) can jointly affect network

performance, but it does not allow us to formulate ideas about the nature of this effect (mediation or moderation effect). Other research design and data analysis techniques are necessary for this purpose. In particular, further analysis would benefit from enrichment of the empirical setting by expanding it to include unsuccessful cases and a quantitative study involving a survey of all of the Swiss Spitex networks.

FIGURE 2. *How to manage successful networks*

NETWORK STRUCTURE

Centrally-integrated	Multi-centrally integrated

NETWORK MANAGEMENT

* low formalization * centralization of power in the network manager * flexible and informal style of management and governance	. high formalization * power sharing among institutional bodies * formal style of management and governance

PERFORMANCE
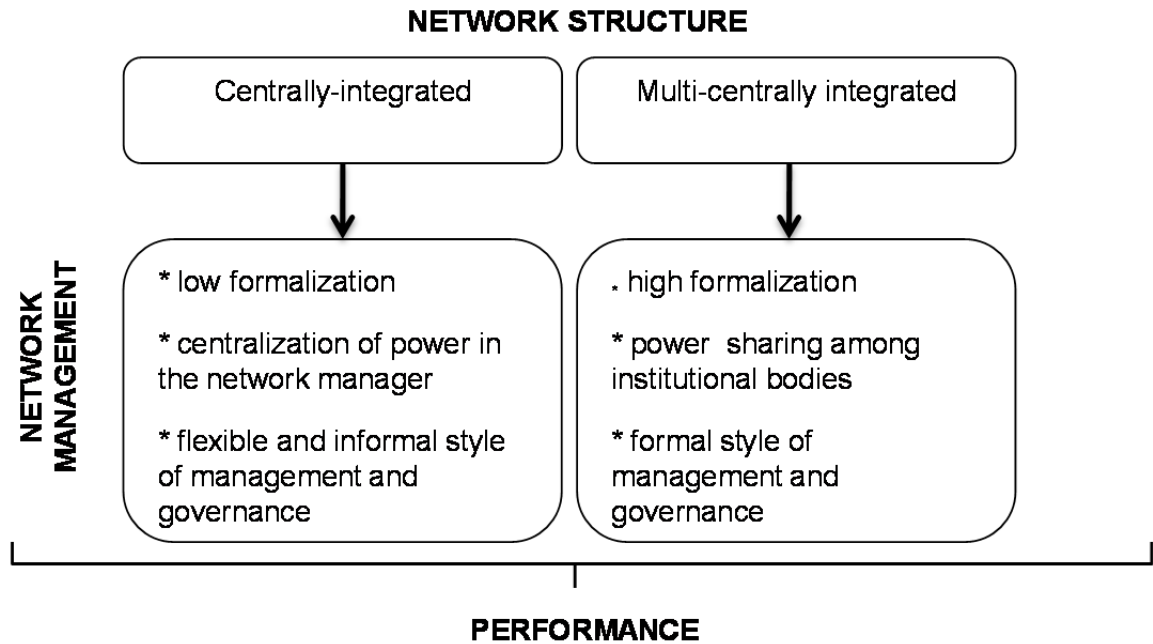
Thirdly, as we considered networks similar in size, we did not include this variable in our analysis, as well as we did not consider other important factors for the network functioning such as trust. Further studies should be conducted to explore the effect of size and trust on the relationship between network structure and mechanisms, as Provan and Kenis (2008) argue, and as one of the anonymous reviewer suggested us.

Fourthly, as Kenis and Provan (2009) suggested, different definitions of network performance may lead different findings; further studies might thus be conducted to explore whether a different definition of network performance, in terms for example of efficiency, leads to different propositions. We are especially, grateful to one of the anonymous reviewers helping us to improve our paper for this insight.

Fifthly, as our method and cases do not allow us to identify the conditions that are necessary for the network success, further studies might employ the Qualitative

Comparative Analysis (QCA) to distinguish between necessary and sufficient conditions.

Further studies might also explore the role of context in affecting the relationships among network structure, mechanisms and manager(s).

Last but not least, more studies about a possible bureaucratization of public networks might be conducted.

References

Agranoff, R. 2003. *Understanding Networks: A Guide for Public Managers*. School of Public and Environmental Affairs, Indiana University, Bloomington, IN.

Agranoff, R. and M. McGuire. 1998a. "Multinetwork Management: Collaboration and the Hollow State in Local Economic Policy." *Journal of Public Administration Research and Theory* 8(1): 67-91.

Agranoff, R. and M. McGuire. 1998b. "A Jurisdiction-based Model of Intergovernmental Management in US Cities." *Publius*, 28(4): 1–21.

Agranoff, R. and M. McGuire. 1999. "Managing in Network Settings." *Policy Studies Review*, 16(1): 19–40.

Agranoff, R. and M. McGuire. 2001a. "Big Questions in public Network management Research." *Journal of Public Administration Research and Theory* 11(3): 295-326.

Agranoff, R. and M. McGuire. 2001b. "After the Network is Formed. Process, Power and Performance." Pp. 11-29 M. Mandell, ed., *Getting Results Through Collaboration Networks and Network Structures for Public Policy and Management*, Westport, CT: Quorum Books.

Agranoff, R. and M. McGuire. 2003. *Collaborative Public Management: New Strategies for Local Governments*. Washington, DC: Georgetown University Press.

Bazzoli, G. J., E. Casey and J. A. Alexander, et al. 2003. "Collaborative Initiatives: Where the Rubber Meets the Road in Community Partnerships." *Medical Care Research and Review* 60(4): 63–94.

Brown, M. M., L. J. O'Toole and J. L. Brudney. 1998. "Implementing Information Technology in Government: An Empirical Assessment of the Role of Local

Partnerships." *Journal of Public Administration Research and Theory* 8(4): 499-525.

Conrad, D. A., Cave, S. H., Lucas, M., Harville, J., Shortell, S. M., Bazzoli, G. J., Hasnain-Wynia, R., Sofaer, S., Alexander, J. A., Casey, E. and F. Margolin. 2003. "Community Care Networks: Linking Vision to Outcomes for Community Health Improvements." *Medical Care Research* 60(4): 95-129.

Cristofoli, D., Maccio', L. and A. Sancino, (2011). *Managing successful networks: the case of intermunicipality collaboration in Switzerland.* 2011 Yearbook Swiss Public administration Society.

Eisenhardt, K. M. 1989. "Building theory from case study research." *Academy of Management Review* 14: 532-550.

Fawcett, S. B., Francisco, V. T., Paine-Andrews, A. and J. A. Schultz. 2000. "A Model Memorandum of Collaborations: A Proposal." *Public Health Reports* 15(May-June): 175-190.

Ferlie, E. and A. Pettigrew. 1996. "Managing Through Networks: Some Issues and Implications for the NHS." *British Journal of Management* 7(March): 81-99.

Ferlie, E., Fitzgerald, I., McGivern, G., Gopson, S. and C. Bennett. 2011. "Public Policy Networks and 'Wicked Problems': A Nascent Solution?" *Public Administration* 89: 307–324.

Hageman, W., Zuckerman, B., Weiner, B., Alexander, J. and R. Bogue. 1998. "Navigating the Rapids of Collaborating Governance." *Health Care Forum Journal* 41: 47-52.

Hasnain-Wynia, R., Sofaer, S., Bazzoli, G. J., Alexander, J. A., Shortell, S. M., Conrad, D., Chan, B., Zukoski, A. P. and J. Sweney. 2003. "Members' Perceptions of Community Care Network Partnerships' Effectiveness." *Medical Care Research and Review* 60(4): 40-62.

Huang, K. and K. G. Provan. 2007. "Structural Embeddedness and Organizational Social Outcomes in a Centrally Governed Mental Health Services Network." *Public Management Review* 9: 169-189.

Jennings, E. T. and J. A. Ewalt. 1998. "Interorganizational Coordination, Administrative Consolidation and Policy Performance." *Public Administration Review* 58(5): 413-421.

Keast, R., Mandell, M. P., Brown, K. and G. Woolcock. 2004. "Network Structures: Working Differently and Changing Expectations." *Public Administration Review* 64(3): 363-373.

Kelman, S., Hong, S. and I. Turbitt. 2011. "Are There Managerial Practices Associated with Service Delivery Collaboration Success?: Evidence from British Crime and Disorder Reduction Partnerships." HKS Faculty Research Working Paper Series RWP11-011, John F. Kennedy School of Government, Harvard University.

Kenis, P. and K. Provan. 2009. "Towards an exogenous theory of public network performance." *Public Administration* 87(3): 440-456.

Kickert, W.J.M., Klijn, E. H. and J.F.M. Koppenjan. 1997. *Managing Complex Networks*. London: SAGE.

Kljin, E-H. 1996. "Analyzing and Managing Policy Processes in Complex Networks: A Theoretical Examination of the Concept Policy Networks and its Problems." *Administration & Society* 28(1): 90-120.

Klijn E.H., Steijn B. and Edelenbos J. (2010). The impact of network management on outcomes in governance networks. Public Administration, 88: 1063–1082.

Koopenjan, J. and E-H. Klijn. 2004. Managing Uncertainties in Networks. A Network Approach to Problem Solving and Decision Making. London: Routledge.

Lindencrona, F., E. Solvig and A. Runo(2009) 'Modes of Interaction and Performance of Human Service Networks', Public Management Review, 11: 2, 191 — 215

Mandell, M.P. 2001. *Getting Results through Collaboration Networks and Network Structures for Public Policy and Management*. Westport, CT: Quorum Books.

Mandell, M. and R. Keast (2007). Evaluating Network Arrangements: Toward Revised Performance Measures. *Public Performance and Management Review*, 30(4):574-597.

McGuire, M. 2002. "Managing Networks: Propositions on What Managers Do and Why They Do It." *Public Administration Review* 62(5): 599-609.

McGuire, M. and Agranoff, R. 2011. "The Limitations of Public Management Networks." *Public Administration* 89: 265–284.

Meier, K. J. and L. J. O'Toole, Jr. 2001. "Managerial Strategies and Behaviour in Networks: A Model with Evidence from US Public Education." *Journal of Public Administration Research and Theory* 11(3): 271–93.

Meier, K. J., and L. J. O'Toole, Jr. 2003. "Public Management and Educational Performance: The Impact of Managerial Networking." *Public Administration Review* 63(6): 689–99.

Milward, B. H. and K. G. Provan. 2003. "Managing the Hollow State. Collaboration and Contracting." *Public Management Review* 5(1): 1-18.

Mitchell, R. E., Florin, P. and P. E. Stevenson. 2002. "Supporting Community-Based Prevention and Health Promotion Initiatives: Developing Effective Technical Assistance Systems." *Health Education and Behavior* 29(5): 620-639.

O'Toole, L. J. 1997. "Treating Networks Seriously: Practical and Research-Based Agendas in Public Administration." *Public Administration Review* 57: 45-52.

O'Toole, L. J., Jr. and K. J. Meier. 2003. "Bureaucracy and Uncertainty." Pp. 98 - 117 B. C. Burden, ed., *Uncertainty in American Politics*, Cambridge: Cambridge University Press.

O'Toole, L. J. and K. J. Meier. 2004. "Public Management in Intergovernmental Networks: Matching Structural Networks and Managerial Networking." *Journal of Public Administration Research and Theory* 14(4).

Pratt, M. G. (2008). Fitting Oval Pegs Into Round Holes Tensions in Evaluating and Publishing Qualitative Research in Top-Tier North American Journals. *Organizational Research Methods*, 11: 481-509.

Provan, K. G. and B. H. Milward. 1995. "A Preliminary Theory of Interorganizational Network Effectiveness." *Administrative Science Quarterly* 40(1): 1-33.

Provan, K. G. and B. H. Milward. 2001. "Do Networks Really Work? A Framework for Evaluating Public Sector Organizational Networks." *Public Administration Review* 61(4): 414-423.

Provan, K. G. and J. G. Sebastian. 1998. "Networks Within Networks: Service Link Overlap, Organizational Cliques, and Network Effectiveness" *Academy of Management Journal* 41(4): 453-463.

Provan K. G., M. A. Veazie, L. K. Staten and N. I. Teufel-Shone. 2005. "The Use of Network Analysis to Strengthen Community Partnerships." *Public Administration Review* 65: 603–613.

Scott, J. 1991. *Social network analysis*. London: Sage Publications.

Shortell, S. M., Zukoski, A. P., Alexander, J. A. et al. 2002. "Evaluating Partnership for Community Health Improvement: Tracking the Footprints." *Journal of Health Politics, Policy and Law* 27(1): 49–91.

Steiner, R. 2003. "The causes, spread and effects of intermunicipal cooperation and municipal mergers in Switzerland." Public Management Review 5(4): 551-571.

Susskind, L. and J. Cruikshank. 1987. Breaking the Impasse. Consensual Approaches to Resolving Public Disputes. Basic Books, Inc. USA.

Turrini, A., Cristofoli, D., Frosini, F. and G. Nasi. 2010. "Networking literature about determinants of network effectiveness." Public Administration 88(2): 528-55.

Voets, J , W. Van Dooren and F. De Rynck(2008) 'A Framework for Assessing the Performance of Policy Networks', Public Management Review, 10: 6, 773 — 790.

Weiner, B. J. and J. A. Alexander. 1998. "The Challenges of Governing Public-Private Community Health Partnerships." *Healthcare Management Review* 23(2): 39-55.

Weiner, B. J., Alexander, J. A. and H. S. Zuckerman. 2000. "Strategies for Effective Management Participation in Community Health Partnership." *Health Care Management Review* 25(3): 48–66.

Yin, R. K. 1984. *Case study research: Design and methods*. Beverly Hills: Sage.

Zacocs, R. C. and E. M. Edwards. 2006. "What Explains Community Coalition Effectiveness? A Review of the Literature." *American Journal of Preventive Medicine* 30(4): 351-361.

To wind a skein into a ball: exploring the concept and measures of public network performance*

Abstract

Since Provan and Milward's article in 1995, tens of papers have been published about network performance and a wide variety of conceptualizations and measures have been proposed. The lack of consensus among scholars has generated such a confusing landscape that in 2009 Kenis and Provan were still arguing that the concept of network performance is poorly defined, improperly operationalized and badly measured. In an attempt to wind a skein into a ball, our paper aims to systematize the conceptualizations and measures of network performance proposed by the existing literature into a multidimensional model and explore its construct validity. Structural equation modelling techniques were used for this purpose. Data were collected through a survey administered to 238 persons working in homecare assistance networks. The results seem to suggest that conceptualizing and measuring network performance is actually easier than one might think.

1. Introduction

In 1995, Provan and Milward were the first people to propose a conceptualization and measure of public network performance. In order to explore the existence of a relationship between the context, the structure and the effectiveness of mental health delivery networks, they used a multi-perspective and multi-measure approach to assess client well-being.

Since then, many authors have proposed various conceptualizations and measures of network performance. Some focused on the performance of the network from the partner organizations' point of view (Provan *et al.* 2005; O'Toole and Meier 2004, 2006; Kiefer and Montjoy 2006; Goerdel 2006; May and Winter 2007; Meier and O'Toole 2001, 2003, 2010; LeRoux *et al.* 2010; Akkerman and Torenvlied 2011), others took into account the entire network (Mandell *et al.* 1994; Provan and Milward 1995; Provan and Sebastian 1998; Keast *et al.* 2004; Van Raaij 2006; Lindecrona *et al.* 2009; Provan *et al.* 2009; Herranz 2010) and others still looked at matters from the community's perspective (Provan and Milward 1995; Provan and Sebastian 1998). Some authors evaluated network performance by looking at the network structure (Provan *et al.* 2005), some considered the network processes (Mandell *et al.* 1994; Keast *et al.* 2004; Van Raaij 2006), and others focused on the network output and outcome (Provan and Milward 1995; Provan and Sebastian 1998; Meier and O'Toole 2001, 2003, 2010; O'Toole and Meier 2004, 2006).

The resulting landscape was so confusing that in 2009 Kenis and Provan were still arguing that it is difficult to answer the questions "what is performance?" and "how should performance be measured?" (Kenis and Provan, 2009, p. 442).

Given this situation, our paper represents an attempt to wind a skein into a ball. In particular, by focusing on service-delivery networks, and taking Kenis and Provan's (2009) invitation to concentrate on the whole network, our paper aims to systematize the existing conceptualizations and measures of network performance into a unitary and parsimonious model and to explore its construct validity.

The results show that conceptualizing and measuring network performance actually seems to be easier than one might think. According to our study, service-delivery networks seem to be considered successful when their structure is able to survive in the long term and achieve the expected outputs. Meanwhile, the development of

collaborative processes seems to be a "prerequisite" for network survival and the achievement of the expected outputs.

Public networks providing homecare assistance in the Italian-speaking part of Switzerland serve as the empirical setting for our study. 238 persons working for these networks, both as administrators and professionals, were surveyed, with a response rate of 49.56%. The data were analysed through the usual techniques of Structural Equation Modelling.

The paper is structured into five sections. The first section reviews the existing literature on the concepts and measures of network performance in service-delivery networks. The second section proposes a multidimensional model of network performance. The third section describes the method employed in the study and the fourth presents its results. The final section discusses these results, acknowledges the limitations of the study and suggests possibilities for future empirical research in the field.

2. **Conceptualizing and measuring network performance: from the origins of the concept to the present day**

After a period when simply establishing a network was considered a success, scholars and practitioners have started to ask themselves whether and when public networks really work (to recall Provan and Milward 2001). Studies investigating the network performance (network effectiveness or network success, as it was variously labelled) subsequently proliferated, and scholars were forced to give a definition of network performance in their works.

Starting from the seminal work of Provan and Milward (1995), below we will review the studies of the performance of service-delivery networks in such a way as to reveal the complexity of the concept and outline the various measures that are normally proposed to evaluate it. Table 1 gives a list of concepts and measures of network performance, as described in the existing literature.

As previously stated, the concept of network performance appeared for the first time in 1995, along with an attempt to define and measure it. In their study concerning mental health delivery networks, Provan and Milward (1995) conceived network performance (effectiveness in their parlance) in terms of network outcome, or enhanced client well-being, and proposed a multi-perspective and multi-measure approach to

evaluate it. More specifically, they identified three categories of key stakeholders affected by the network (clients, their families and their therapists) and through a factor analysis they recognized two measures of well-being for clients (quality of life and improvements in their medical status) and one measure for both families and therapists (quality of life). Provan and Milward (1995) originally aimed to develop a single measure of network performance by combining the perspectives of clients, families and therapists, but the views of network effectiveness were so varied among the three categories of stakeholders that they preferred to keep them separate. They concluded that the choice of the best factors to explain network outcomes depends on whose effectiveness perspective is being considered.

In 1998, Provan and Sebastian focused on network outcome for clients (in terms of quality of life and medical status for clients, and quality of life for families) and evaluated the final performance of networks by averaging the single factor scores.

In 2001, Provan and Milward enriched the 1995 framework for the evaluation of network performance. They stated that in order to evaluate public networks, it is necessary to consider the network's benefits for three categories of players: the community, or the pool of clients that is served by the network; the network itself and those who work for the network as administrators or service-level professionals; and the member organizations that monitor and fund network activities. Provan and Milward (2001) operationalized the concept of network effectiveness and proposed some measures to evaluate it. They argued that to appreciate the contribution made by the network to the community, it is necessary to focus on the overall costs of the treatment/services for the whole community, while also considering the quality and effectiveness of the services provided to clients. To appreciate the benefits for those working for the network, it is necessary to focus on the network's ability to grow and survive over time. Accordingly, they suggested examination of the ebb and flow of organizations to and from the network, the range of services provided, the strength of the relationships and the presence of an administrative structure or NAO. To appreciate the network's benefits for the partner organizations, Provan and Milward (2001) suggested considering the returns of network membership for the partner organizations in terms of greater legitimacy, resource accessibility, cost reduction and enhanced client outcomes. At the end of the paper, Provan and Milward (2001) pointed out that the

importance of single measures can vary depending on the phase of development in which the network finds itself (emergence of a coalition, transition to a federation, maturity of the federation and critical crossroads). They invited scholars to consider the three dimensions simultaneously, although they admitted that they can be contrasting, and they recommended focusing on the outcome for clients as the most important dimension of network performance.

In 2005, by exploring the advantages of social network analysis in the study of service delivery networks, Provan *et al.* (2005) gave a better overview of the measures of network performance on an organizational level. In order to appreciate network performance, they argued that it is necessary to consider the expectations of the network's participants with regard to the network outcomes, and more specifically their perception of the expected advantages and drawbacks of network evolution.

Similarly, in 2007 May and Winter focused on network performance in terms of organizational outcomes. To evaluate it, they proposed a perceived outcome index based on the responses of middle managers about the extent to which the municipality involved in the network has succeeded in getting clients to search for jobs, to be available for work, and to enter ordinary employment on a scale of 1 to 10. Similarly, in a study that explored the effect of networks on organizational performance, Schalk *et al.* (2010) measured organizational performance in terms of individual client satisfaction.

In 2008, by exploring the relationship between network governance and its impact on network effectiveness, Provan and Kenis came back to the concept of network performance and recognized problems regarding its conceptualization and measurement. In their paper, they defined network effectiveness as "the attainment of positive network level outcomes that could not normally be achieved by individual organizational participants acting independently" (Provan and Kenis 2008, p. 230). Consequently, they suggested some variables that should be taken into account in order to evaluate network performance: network efficiency, network effectiveness, internal and external network legitimacy (Human and Provan 2000), and network stability. They concluded that the relative importance of these factors can vary according to the form of network governance (i.e. participant-governed networks, lead organization-governed networks and network administrative organizations).

In 2009, Kenis and Provan elaborated further on this framework. Firstly, they recommended focusing on the performance of the network as a whole, since it is "the most appropriate level in the public sector". Secondly, they listed a series of measures that are normally used to evaluate network performance and argued that each measure is as "legitimate as any other to assess a network" (Kenis and Provan 2009, p. 444). Consequently, each measure can be chosen by the researcher. What is important is that the chosen measure is in keeping with the perspective of those who evaluate the network (as Provan and Milward previously showed in 1995 and 2001) and certain exogenous network characteristics, i.e. network governance (shared governance networks, lead organization networks, NAOs), network inception (mandatory vs. voluntary networks) and the network development stage (emergence of a coalition, transition to a federation, maturity of the federation and critical crossroads).

Furthermore, by exploring the relationships between network embeddedness and organizationally-based social outcomes (trustworthiness, reputation and influence) in centrally governed health and human service networks, Provan *et al.* (2009) examined how service network performance is related to network evolution, and suggested collecting information about network performance by surveying the NAO directors on: cost control, quality of services, coordination of care, access to services by clients and resource availability.

More recently, in an attempt to look for a relationship between network management coordination strategies and network performance, Herranz (2010) focused on workforce development networks in Boston and proposed an operationalization of the Provan and Milward (2001) theoretical framework based on two objective measures for each level of network performance.

From a different perspective, in 1994 Mandell *et al.* distinguished between measures of performance focused on task accomplishment and measures focused on the development of new behaviours. They argued that the central issue when evaluating network performance is not the task accomplished by a network but new ways of behaving and managing (such as the development of trust, ways of communicating between members and development of commitment).

Similarly, in 2004 Keast *et al.* recommended taking into account three categories of factors related to network functioning in order to evaluate network performance: the

development of a joint mission; partner interdependence; and the development of unique structural arrangements. Keast *et al.* argued (2004) that the first factor is related to the fact that when entering the network, members begin to see themselves as "one small piece of a larger whole" and need a new set of values and attitudes that reshape the views of the individual members. The second factor is related to the fact that in a network members are not simply interconnected, but they depend on each other; "this means that each member begins to see himself or herself as one piece of a larger picture". "Stepping into others' shoes" is the way in which Keast *et al.* (2004) described this factor. The third factor deals with the development of a unique structural arrangement involving representatives of many diverse organizations and groups.

In 2006, by comparing four healthcare networks, Van Raaij showed that for better evaluation of network success, it is necessary to take into consideration three norms: the norm of network legitimacy, the norm of activating capacity, and the norm of network climate. She argued that in service delivery literature, objective as well as subjective measures of network performance are normally deduced from formal network goals and/or previous literature on the measurement of organizational performance. Therefore, she suggested that if networks vary in achieving their own norms, these norms can be understood as a supplementary set of performance indicators for network success.

In a similar vein, in 2008 Head stated that in order to really appreciate network performance, it is not enough to consider the structure or output measures proposed by the existing literature. Measures concerning the processual side of network functioning should also be taken into consideration. Consequently, Head (2008) recommended focusing on assessing whether good processes and relationships have been developed within the network as a measure of network performance, and stated that the quality and coherence of network processes are largely measurable through the perceptions of participants. Such perceptions may be variable among stakeholders and may also change over time.

By focusing on collaborative networks, in 2007 and 2008 Mandell and Keast continued to elaborate on this idea and developed a set of measures to assess network performance by also considering the processual side of network activity. They shed light on the limitations of traditional performance measures that focus on the outcomes

of single organizations, and claimed that new and non-traditional methods to evaluate network performance are necessary. They argued that conventional or traditional performance measures "may be adequate and appropriate to assess some network effectiveness criteria, but tend to ignore the predominantly relations operating style of networks" (2008, p. 716), when "the main purpose of networks is to link members and their resources, facilitate joint action and learning and in doing so, leverage from these collective interactions to respond in a new and innovative way to issues" (2008, p. 716). Accordingly, they focused on long term results and the ability of the network to change systems, develop new relationships, and integrate individual participants into a new whole as measures of network performance. More specifically, Mandell and Keast (2008) identified three levels of network operation (environmental, organizational and operating) and proposed measures of network performance at each level. The environmental level refers to external stakeholders who are able to have an impact on network activity. At this level, the measures of network performance concern the continuing support given to the network by critical stakeholders providing resources, support and legitimacy. The organizational level concerns the structural characteristics of the network, the development of a joint vision and commitment to the whole, the extent to which critical stakeholders are included in the process and acknowledgment of the partners' interdependence. The operational level refers to the interaction between partner organizations and the extent to which participants have developed not only a better understanding of each other, but also a shared language and culture, new ways of communicating and the ability to find common ground. At the end, Mandell and Keast (2008) shed light on the fact that the measures of network performance vary in importance, depending on the phases of network development (network formation, struggle for network stability, network routinization and network extension).

Moving in the same direction, in a 2009 study on the influence of group modes of interaction on the performance of health and human service networks, Lindencrona *et al.* recommended simultaneous contemplation of different dimensions of network performance and client outcomes. Network performance, they argued, covers three different dimensions: comprehensiveness; network learning, which is related to the perceived ability within the network to learn from the ongoing interaction and activities; and client outcomes, which are measured by the percentage of clients that resettled in

the local authority area during a specific year and were still there 24 months after resettlement.

From a different perspective, in 1998 Jennings and Ewalt distinguished between objective and subjective (based on single actors' perception) measures of network performance. They showed that "success along one dimension of policy performance does not necessarily mean success along others" (1998, p. 425) and argued that the former measures are more reliable.

By focusing on objective measures of organizational performance, in their first study exploring the existence of relationships between network management and network performance, Meier and O'Toole (2001) proposed evaluating the performance of Texas school districts in terms of the percentage of students in each school district who pass standardized, state-required reading, writing and mathematics tests each year. Actually, Meier and O'Toole and O'Toole and Meier did not study organizational networks as a collection of organizations; rather they studied the networking behavior of critical stakeholders (as school superintendents). However, we thought to include them in our literature review due to the importance of their work for the network performance measurement; in the following of the paper we will neglect their perspective.

To elaborate further in that direction, O'Toole and Meier (2004, 2006) and Meier and O'Toole (2003, 2010) explored how network management in school districts influences an array of performance results. More specifically, they proposed ten different indicators to measure network performance on an organizational level. They are based on student performance and varying levels of importance are attributed to them by critical stakeholders (e.g. the government, students and families, policymakers).

On the basis of the Meier and O'Toole (2001, 2003, 2010) and O'Toole and Meier (2004, 2006) measures, in 2006 Goerdel explored how network management induces positive organizational outcomes in the education sector and proposed other objective performance indicators based on the students' performance.

In 2006, Kiefer and Montjoy proposed another measure for objective evaluation of the success of the collaboration developed to deal with Hurricane Katrina: the ability to evacuate residents before a major disaster. In 2010 LeRoux *et al.* assessed network

success in terms of interlocal service cooperation, which was measured as the number of interlocal agreements reported at the municipal department level by each respondent. Similarly, in a study of nursing colleges, Akkerman and Torenvlied (2011) evaluated network performance in terms of organizational outcomes and considered the diploma rate and the drop-out rates.

On the basis of the articles reviewed, it seems apparent that many scholars have tried to conceptualize and measure network performance since Provan and Milward's work (1995) and they have done it in very different ways. As our literature review shows, differences in performance conceptualization and measurement occur depending on the network level (community, network, partner organizations), the focus on the network structure, the network process or the network output/outcome and the nature of the proposed indicators (objective or subjective measures of network performance).

As a result of this lack of consensus among academics, despite the plethora of studies of network performance, fifteen years after Provan and Milward's work (1995), scholars still claim that the concept of network performance is not properly defined and operationalized and that valid and reliable measures to evaluate it are still lacking (Kenis and Provan 2009; McGuire and Agranoff 2011).

TABLE 1. *Categorization of extant studies on network performance*

	Measures of network performance	COMMUNITY LEVEL	NETWORK LEVEL	ORGANIZATIONAL LEVEL	NETWORK STRUCTURE	NETWORK PROCESS	NETWORK OUTPUT/ OUTCOME	SUBJ MSR	OBJ MSR
Provan and Milward 1995 Provan and Sebastian 1998	They conceived the network performance in terms of network outcome, or enhanced client well-being, for three categories of stakeholders (clients, families and therapists) and proposed: • two measures of well-being for clients (in terms of quality of life and improvements in their medical status) • one measure for both families and therapists (in terms of quality of life)	√					√	√	
Provan and Milward 2001	They identified three levels of network performance (community, network and partner organizations), and proposed measures at each level: • community level: overall costs of the treatment/services for the whole community and quality and effectiveness of the provided services for clients (in terms of service accessibility, service utilization, service responsiveness, service integration, client well-being and/or changes in the problem incidents) • network level: network ability to growth and survive over time. Accordingly, they proposed to consider the ebb and flow of organizations to and from the network (in terms of difference between the entrance rate and the exit rate), the range of provided services (in terms of provision of core and ancillary services), the strength of relationships (in terms of multiplexity) and the presence of an administrative structure or NAO (as signals of the partners' wish to maintain the network) • partner organizations: returns of the network membership for the partner organizations (in terms of enhanced legitimacy, resource accessibility, cost reduction and enhanced client outcomes)	√	√	√	√		√	√	(√)
Provan *et al.* 2005	They argued that in order to appreciate the network performance, it is necessary to consider the partners' perception of the evolution of the: • network expected advantages (in terms of increased ability to serve clients; increased ability to serve the community as a whole; increased			√			√	√	

	ability to acquire additional funding and resources; increased ability to acquire new knowledge or skills; better use of partner organization's services; development of new relationships helpful to the partner organizations; improvement in the public profile of the partner organizations; enhanced influence in the community; increased ability to reallocate resources) • network expected drawbacks (in terms of increased efforts in terms of time and resources; loss of control/autonomy over decisions; strained relations within the partner organizations; difficulty in dealing with partners; not enough credit given to the partner organizations)								
May and Sren 2007	They proposed an index of perceived outcome based on the responses of middle managers about the extent to which the municipality involved in the network has succeeded in getting clients to search for jobs, to be available for work, and to enter ordinary employment on a scale of 1 to 10			√			√	√	
Scalk *et al.* 2010	They proposed to consider the individual client satisfaction			√			√	√	
Provan and Kenis 2007	They suggested some variables to take into account in order to appreciate the network performance network efficiency (in terms of ratio outputs/inputs), network effectiveness, network internal and external legitimacy (Human and Provan 2000), network stability (as the ability to develop long-tern relationships with other network members)	√	√	√	√		√	√	(√)
Kenis and Provan 2009	They listed a series of measures normally used to evaluate the network performance i.e., efficiency, effectiveness, goal attainment, equity, quality, productivity, level of conflict, growth, survival, profit, stability, resilience, client satisfaction, satisfaction of professionals working in the network, learning etc.)		√		√	(√)	√	√	(√)
Provan *et al.* 2009	They examined how the service network performance is related to the network evolution, and proposed to collect information about the network performance by surveying the NAO directors on: cost control, quality of services, coordination of care, access to services by clients and resource availability		√			(√)	√	√	
Herranz 2010	By focusing on networks for the development of workforce in Boston, Herranz (2010) operationalized the theoretical framework proposed by Provan and Milward (2001), and identified a set of two measures for each level of network performance: • community level: changes in problem incidence (in terms of job placement rate of individuals who received services through the network and by considering the perception of services integration by network client)								

	• network level: i.e., total number of job posting by employers as a measure of the broad connections with many business employers, and the strength of connections with several business employers, representing relatively intense and repetitive relationships with several businesses • organization level: financial resource acquisition in terms of 3-year aggregation of the public funds, fee-based revenue, and total budget revenue of the network hub organizations and the average cost of providing a measurable unit of service, operationalized as the average cost per total number of job postings and job placements	√	√	√	√		√	√	√
Mandell *et al.* 1994	They distinguished between measures of performance focused on task accomplishment and measures focused on the development of new behaviours, and argued that it is not the task accomplished in a network that is central in evaluating the network performance, but rather new ways of behaving and managing (like the development of trust, ways of communicating among members and development of commitment)		√			√		√	
Keast *et al.* 2004	They invited to take into account three categories of factors related to the network functioning to appreciate the network performance: • the development of a common mission (in terms of synergies development; doing more with less; development of more meaningful programs; improvement in the power by being able to convince the "power brokers" in government—because of the increased "strength" of the network members as a whole; development of points of convergence, rather than of contention; not fighting over scarce resources, but seeing how each wants the same thing; not wasting time and money) • the partner interdependence (in terms development of relationships, development of trust, breakdown of communication barriers, development of new resources" to use (gaining new "eyes and ears" on the scene); development of new "expertise" — meshing different types of expertise; listening to both professional and community "experts"; recognizing the expertise of others; resolving conflicts (or potential conflicts) • the development of a unique structural arrangements (in terms of actively doing something; systems change; members need to represent their own organizations and the network structure; new way of thinking; risk taking; flexible, innovative ideas merge; visible/invisible conflicts)		√			√		√	

Reference	Description								
Van Raaija 2006	She suggested that to appreciate the network success it is necessary to take into consideration three norms: the norm of network legitimacy, the norm of activating capacity, and the norm of network climate		√				√		√	
Head 2008	He invited to focus on assessing whether good processes and relationships have been developed within the network as a measure of network performance, and stated that the quality and coherence of network processes are largely measurable through the perceptions of participants.		√				√		√	
Mandell and Keast 2007, 2008	They identified three levels of network operation (environmental, organizational and operating level) and proposed measures of network performance at each level • The environmental level refers to external stakeholders; at this level the measures of network performance concern the continuing support given to the network by critical stakeholders proving resources, support and legitimacy • The organizational level concerns the structural characteristics of the network, the development of a common vision and commitment to the whole, the extent to which critical stakeholders are included in the process and the acknowledgment of the partner interdependence • The operational level refers to the interactions among the partner organizations and the extent to which participants have developed not only a better understanding of each other, but also a shared language and culture, new ways of communicating and the ability to find common ground		√				√		√	(√)
Lindencrona *et al.* 2009	They identified three dimensions of network performance: comprehensiveness; network learning, related to the perceived ability within the network to learn from the on-going interactions and activities, and client outcomes measured by the percentage of clients that had resettled in the local authority area during the considered year and that twenty-four months after resettlement		√				√	√	√	√
Meier and O'Toole 2001	They appreciated the performance of Texas school districts in terms of the percentage of students in each school district who pass state required, standardized reading, writing, and mathematics tests each year			√				√		√

Meier and O'Toole 2003, 2010, O'Toole and Meier 2004, 2006	They proposed ten different indicators to measure the performance of school districts: i.e., the percentage of students in a district who pass all (reading, writing, and math) sections of the Texas Assessment of Academic Skills (TAAS) test; TAAS scores for subgroups of students (i.e., Anglo, black, Latino, and low-income students); three measures of college-bound student performance (average ACT score, average SAT score, and the percentage of students who score above 1,100 on the SAT (or its ACT equivalent); attendance rates and dropout rates	√				√		√	
Goerdel 2006	He used several indicators to appreciate the performance of school districts: the percentage of overall students in each school district who pass all parts of the state wide standardized test each year—the Texas Assessment of Academic Skill test, commonly known as the TAAS test; attendance; dropout rate; average SAT scores; average ACT scores; percentage of students who score above 1110 on the SAT; percentage of African American students who pass the TAAS exam; percentage of Latino students who pass the TAAS exam; percentage of low-income students who pass the TAAS exam	√				√		√	
Kiefer and Montjoy 2006	They proposed another measure to objectively appreciate the success of the collaboration developed to face the disaster caused by Hurricane Katrina: i.e., ability to evacuate residents in advance of a major disaster	√				√		√	
Akkerman and Torenvlied 2011	In the case of colleges for nursing study, they appreciated the network performance in term of organizational outcomes and considered the diploma rate and the drop-out rates	√				√		√	
Le Roux et al. 2010	They appreciated the network success in terms of interlocal service cooperation, measured as the number of interlocal agreements reported at the municipal department level by each respondent	√				√		√	

3. A multidimensional model of network performance

In an attempt to instil some order in this confusing landscape, below we will systematize the conceptualizations and measures of network performance proposed by the existing literature into a unitary model (Figure 1). In particular, we will focus on service-delivery networks, accept the invitation from Provan *et al.* (2007) to concentrate on networks as a whole, and propose a multidimensional model of network performance made up of three key dimensions: structure-related, process-related and output-related constructs and measures (Figure 1).

As far as network structure is concerned, following the work of Provan and Milward (2001), networks can be considered successful when they are able to survive in the long term. Network survival allows network clients to access services in a stable way and gives network workers stable jobs, while the network partners can systematically exploit the advantages of the network. Accordingly, following the existing studies (Provan and Milward 2001; Kenis and Provan 2007, 2009), four measures can be used to assess the network's ability to survive in the long term. In particular, Mandell and Keast (2008) recommend considering the willingness of critical network stakeholders to continue investing resources in the network's activity. They defined this concept as internal (from network workers) and external (from politicians, citizens and mass media) network legitimacy (Human and Provan 2000; Provan and Kenis 2007).

As far as the network process is concerned, following Keast *et al.* (2004), networks can be considered successful when the collaboration between partners works. Following Keast *et al.* (2004) and Mandell and Keast (2007 and 2008), collaboration works when it leads to the creation of a new organizational form that exists by itself, independently from the network partners. In this case, network participants can feel that they are part of a whole and no longer subject to pressure from their former organizations. Following Mandell and Keast (2008), this can be operationalized into three variables: the development of partner inclusion; the development of network identity; and the development of a unique structural network arrangement. According to Mandell and Keast (2008), three measures can be used to evaluate partner inclusion: independence, dependence and interdependence. The greater the feeling of independence among network participants, the better chance the network will have of existing as an

organizational arrangement of its own. Following Provan and Milward (2001) and Mandell and Keast (2007 and 2008), the development of network identity can be measured in terms of identification with the network and commitment to the network. By drawing from organizational literature, the identification with the network characterizes: "the process by which the goals of the organization and those of the individual become increasingly integrated or congruent" (Hall *et al.* 1973, p. 177). Similarly, the commitment to the network values and activity can be considered a signal of the establishment of an organization that exists by itself, with its own identity. On the basis of the organizational literature, network commitment can thus be defined as a psychological state characterizing the link between an individual and his or her organization and it is closely related to the decision to stay within it or leave. Last but not least, following Keast el al. (2004) and Mandell and Keast (2008), the development of network communication and integration tools can be evaluated in terms of development of a new culture and shared values; a new vision and shared sensitiveness; a new way to communicate and a shared language; a new way to operate and shared procedures. The development of these organizational tools gives the network participants access to specific instruments and tools for fostering the collaboration within the network.

Last but not least, as far as the network outputs are concerned, following Provan and Milward (2001) and Kenis and Provan (2007, 2009), networks can be considered successful when they are able to achieve their expected objectives. Normally, the expected outputs of public networks can be expressed in terms of improved efficiency, effectiveness and equity (Provan and Milward 2001; Kenis and Provan 2007, 2009). Consequently, the expected objectives in terms of efficiency, effectiveness and equity reflect the network's ability to achieve its own objectives.

Figure 1 provides an overview of the model to conceptualize and measure network performance, as resulting from the systematization of the existing studies.

FIGURE 1. *Overarching construct, constructs and measures of network performance*
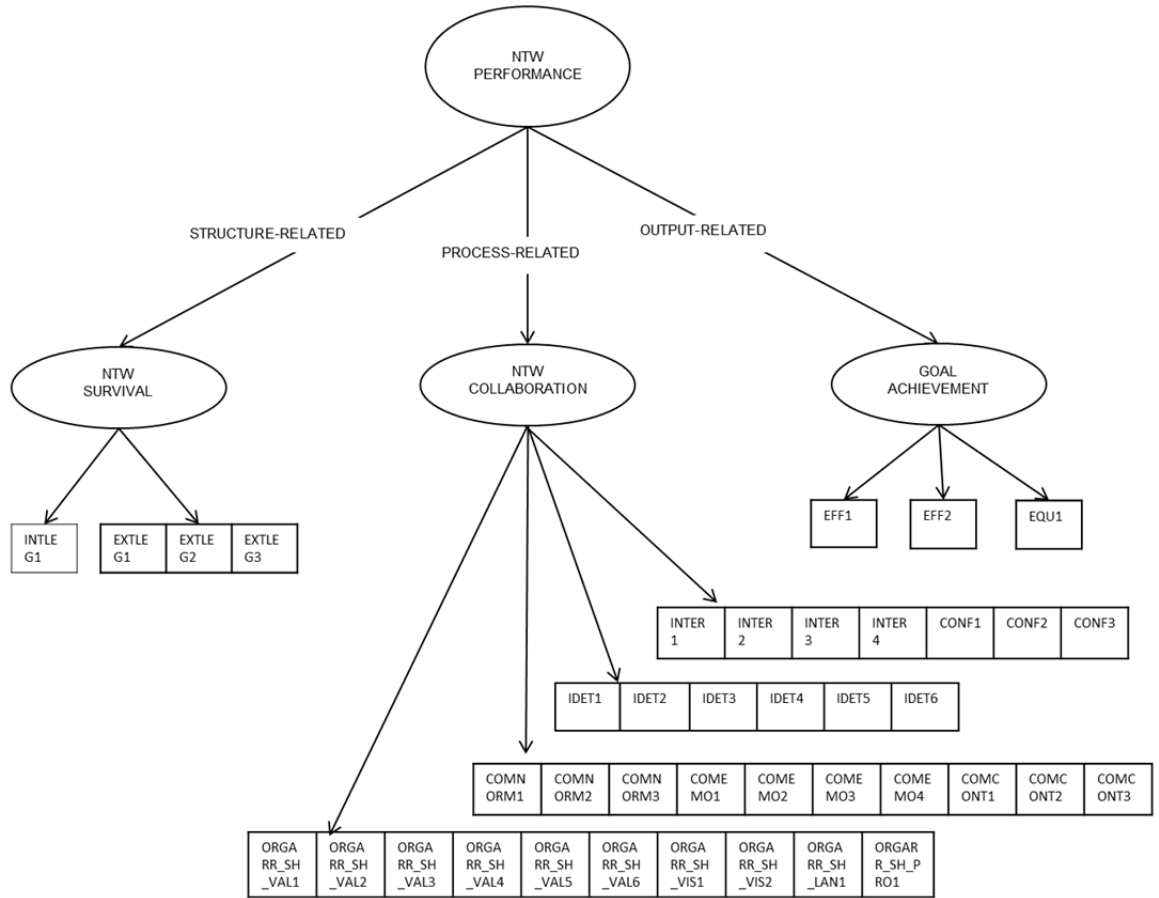
4. Methodology

In order to evaluate the construct validity of the proposed model, we collected data through a survey and analysed them with the usual statistical method of structural equation modelling.

Sample and Data collection

Public networks for the provision of homecare assistance in the Italian-speaking part of Switzerland served as the empirical setting for our study[1]. Normally, these public networks involve: the Cantonal Government and municipalities that fund and control the network activity; an administrative and operative organization, which at the same time administers and coordinates the activity of the network members and provides homecare services by itself; non-profit organizations (activated by the administrative

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[1] "*Structure, mechanisms and managers in successful networks*" (2013), Public Management Journal.

and operative organization, according to specific patient needs) that provide complementary services such as public transport, daily assistance and night-time assistance.

Following the lead of Head (2008), we used the perception of participants in these networks as the best way to collect data on network performance when process-related measures are involved.

First of all, the questionnaire was administered to a pilot group of 8 network workers (administrators and professionals). Respondents were asked for feedback on the comprehensibility of the items and the perceived nexus with their idea of network performance. Most of the questions were considered easily understandable and coherent with the individual workers' idea of network performance. The others had to be reworded, using the specific terminology normally employed by the network workers.

Secondly, the revised questionnaire was then given to those working for the networks on a political, administrative and professional level, both in a paper-based and an internet-based format. 238 people throughout the partner organizations were reached.

More specifically, municipalities and non-profit organizations were firstly reached by an email announcing the objectives and methods of the research project. Representatives of each municipality and non-profit organization were then contacted by phone. More information about the research project was given and they were asked to distribute the questionnaire to people within their organizations who contribute to the provision of homecare assistance. A reminder was later given to non-respondents in order to increase the response rate. Administrators and professionals working for the administrative and operative organizations were reached thanks to the CEOs, who gave a paper version of the questionnaire to all of their workers. We had constant contact with the CEOs in order to monitor the data collection process and systematically inform them of the response rate.

We collected 113 responses, with a response rate of 49.56%. The response rate of representatives of municipalities and non-profit organizations providing complementary services for homecare assistance was 50% and the response rate from workers in the administrative and operative organizations was 43%. The characteristics of the respondents are reported in Table 2.

TABLE 2. *Sample characteristics*

	Sample characteristics	
AVERAGE AGE	61	years old
GENDER	75%	male
	25%	female
RESPONSIBILITIES WITHIN THE NETWORK	16%	managerial and governance roles
	80%	involved in the provision of homecare services
	3%	managerial and governance roles and involved in the provision of homecare services
	2%	missing
	1%	politicians
	10%	Ceos
PROFESSIONAL BACKGROUND	14%	persons working at administrative level in the administrative and operative organizations or no-profit organizations
	72%	professionals (medical doctors, nurses, social workers, psychologists, etc. etc.)
	4%	volunteers
PREVIOUS WORK SECTOR	73%	public sector
	18%	private sector
	7%	non-profit sector
	2%	missing
WORK REWARDS	93%	paid work
	7%	unpaid work
Note: 113 respondents		

Network participants were surveyed using the questionnaire presented in Annex 1. According to our model, the questionnaire was divided into three sections: 1. structure-related performance measures; 2. process-related performance measures; 3. output-related performance measures. The second section was made up of four sub-sections: 2.1 interdependence; 2.2 identification; 2.3 commitment; 2.4 network organizational arrangements. Multiple items were created for each section. Survey items were formulated on the basis of other studies. If other studies were not available, we formulated new items, on the basis of the definitions given by the existing literature, and tested them both in the pilot test and with Exploratory Factor Analysis (EFA). The first version of the questionnaire was made up of 40 items. An appendix section was also added to collect personal information about the respondents: occupation, role in the network, full/part-time contract, previous jobs, gender, age, and education.

For each item, we defined a 5-point Likert scale, with 1 meaning "strongly disagree" and 5 meaning "strongly agree".

Data analysis: structural equation modelling

Structural equation modelling is the appropriate statistical technique when the aim is to explain "the variation in a set of observed variables in terms of a set of unobserved variables" (Long 1983, p. 22). Unobserved variables (or latent constructs) are the abstract phenomena that cannot be directly observed; in our case, the overarching construct of network performance and its three key dimensions of structure-related, process-related and output-related constructs (we will label them as second-order and first-order latent constructs respectively in the structural equation modelling parlance). Observed variables are the (manifest) indicators that are believed to represent (on the basis of theoretical considerations) the unobserved variables and make them measurable; in our case, the items of the questionnaire designed to measure network performance, as better explained later (in the following section we will label them as measures, to comply with the structural equation modelling parlance).

The structural equation model is composed of two different but deeply interconnected models: a measurement model (Confirmatory Factor Analysis - CFA) and a structural model (SEM). The measurement model (CFA) focuses on the relationships between latent constructs (the structure-, process- and output-related constructs) and their observed measures (the items of the questionnaire). Its aim is to define how each measure weighs on its related construct and to explore each construct's reliability and validity. The structural model is focused on the causal relationships between the latent constructs (in our case, the overarching construct of network performance and the structure-, process- and output-related constructs). A model is defined as a full latent variable model when it integrates both the measurement and the structural model: it represents both the relationships between latent constructs and measures and the causal relations among latent constructs.

Figure 2 represents the hypothesized full latent variable model in our case. It outlines the system of structural equations linking both latent constructs and latent constructs to measures, according to what emerged from the systematization of the existing literature[2].

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[2] In a first step, we tested a more complex version of our model with two control variables: tenure and working hours within the network. No significant correlations between these control variables and the model concepts were found and, as a consequence, we opted for the more parsimonious model.

FIGURE 2. *Hypothesized full latent variable model*
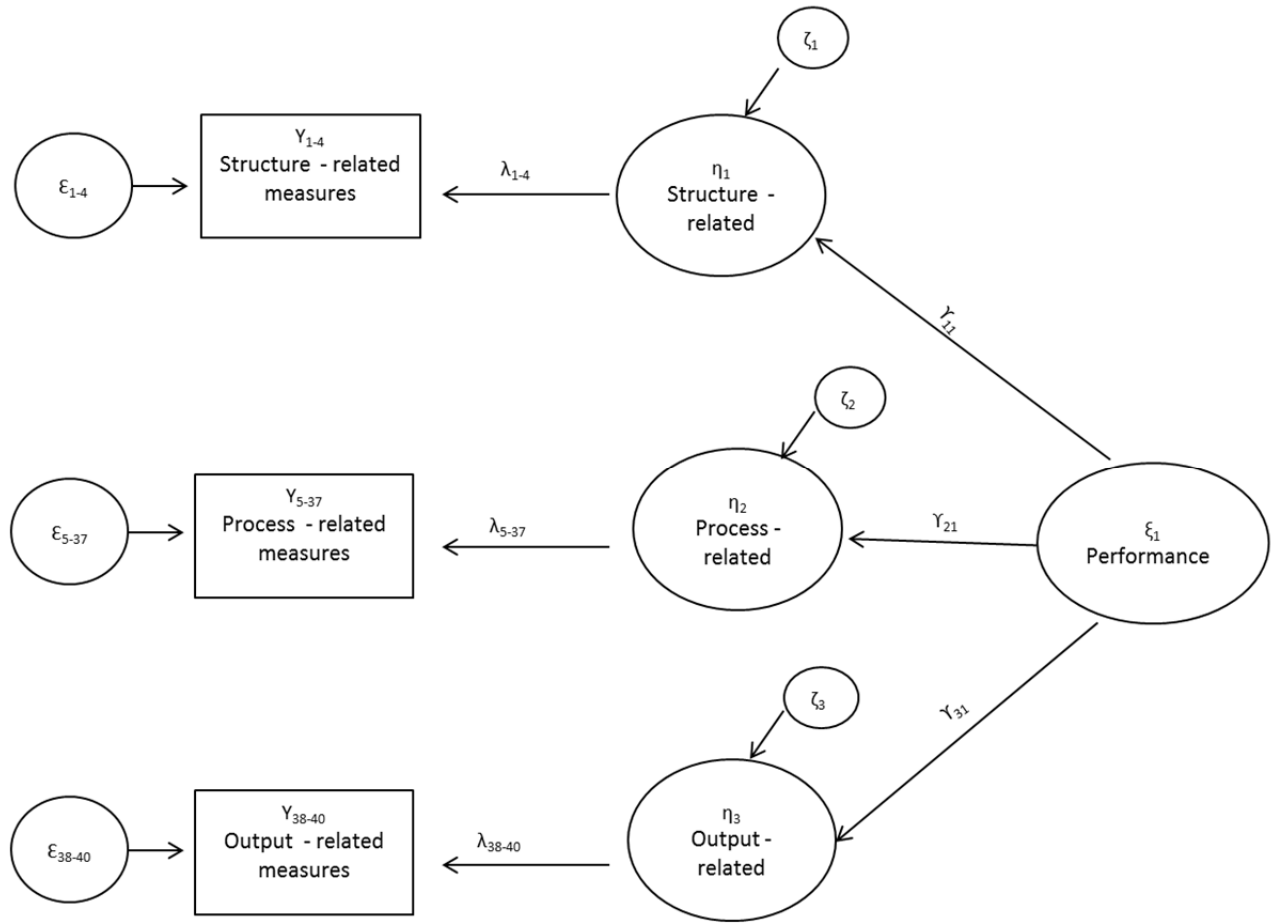
To test it, we followed the lead of Ullman (2006) and took the three steps of (1) model estimation, (2) model evaluation and (3) model modification.

The model estimation step aims to identify the best model to minimize "the difference between the structured and unstructured estimated population covariance matrices" (Ullman 2006, p. 43). Normally, the ML (Maximum Likelihood) test is the most common method to compare alternative models, but as our data are non-normally distributed (as better explained below), we used the ML estimation with the Satorra-Bentler scaled chi-square (1988, 1994, 2001) (SB chi-square), which is also known as the Robust Maximum Likelihood. This allowed us to adjust the chi-square and the standard errors estimates by a scaling factor based on the data's non-normality[3].

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[3] In detail, scaling correction (sc) is calculated as follows (Satorra and Bentler 2001):

The model evaluation step aimed to assess the fit of the measurement and structural models.

As far as the measurement model is concerned, we evaluated the reliability, convergent validity and discriminant validity of each latent construct. To assess the construct reliability we used an index of composite or construct reliability (Fornell and Larckel 1981) ranging from 0 to 1 (cut-off at 0.70). The convergent validity of single constructs was evaluated through both the estimated parameters for each observed construct (which should be high in value and statistically significant – R^2 acceptable) (Anderson and Gerbin, 1998) and the analysis of the Average Variance Extracted (AVE) (which should be higher than .50) (Fornell and Larckel 1981). To evaluate the discriminant validity for each pair of latent variables, we looked at the AVE of each construct, which should be higher than the correlation between the two latent constructs (Fornell and Larcker 1981).

As far as the structural model is concerned, we used multiple tests to evaluate the fit of the overall model, as there is no consensus among academics about the best test. In particular, we used (Hu and Bentler, 1999; Hooper *et al.* 2008): the (SB) chi-square, which requires a statistically insignificant result at a 0.05 threshold level for a good fit (given its sensitiveness to the sample size, researchers have provided alternative indices such as the relative/normed chi-square that is chi-square/df, which should range from 1 and 3); the Root Mean Square Error of Approximation (RMSEA), which should range between 0.08 and 0.10 for a mediocre fit and below 0.08 for a good fit; the Adjusted Goodness of Fit (AGIF), which should range from 0 to 1 (its cut-off point is generally set at 0.90 for a good fit); the Standardized Root Mean Square Residuals (SRMR), which can go from 0 to 1, with values lower than 0.08 considered acceptable; and the Comparative Fit Index (CFI), which ranges from 0 to 1 and recommends that values for a good fit should be greater than 0.95.

$$sc = \frac{(dfnest)\left(\frac{X^2 MLnest}{X^2 SBnest}\right) - (dfcomp)\left(\frac{X^2 MLcomp}{X^2 SBcomp}\right)}{dfnest - dfcomp}$$

This scaling correction is used together with ML chi-square values to determine the statistical test for SB chi-square difference:

$$X^2 SBdifference = \frac{X^2 MLnest - X^2 MLcomp}{sc}$$

The model modification step aims to improve the fit of the model, by modifying the original model (comparison model) and comparing it to modified ones (nested models). As already explained, we employed the SB chi-square to compare nested models and evaluate the model modifications. When the SB chi-square difference was not significant, we opted for the more parsimonious model, i.e. the original model, with a higher degree of freedom and higher chi-square. When the difference was significant, we opted for the nested model, which supports a significant improvement (a diminution) in the chi-square fit index with lower degrees of freedom.

5. Analytical Procedure and Results

Data screening

We started our analysis by checking the adequacy of our sample of 113 cases. We used a mean substitution approach to deal with missing values. We assessed both univariate and multivariate normality indices. Univariate analysis was conducted to examine outliers, skewness and kurtosis and multivariate analysis to assess Mardia's coefficient for multivariate normality and the Mahalanobis distance for multivariate outliers. We found violation of both univariate and multivariate normality and we decided to delete 16 outlier cases. Dealing with non-normal distribution but with a limited sample, we could not use distribution-free estimation techniques (such as WLS based on a polychoric correlation matrix). Therefore, we opted for the use of the Satorra-Bentler scaled statistics (Robust Maximum Likelihood) as previously explained, which adjust the model chi-square and standard error estimates by a scaling factor based on the data's non-normality (Byrne, 2009).

Measurement and Structural model

Once we had established our multidimensional model to conceptualize and measure network performance, with its 40 measures, 3 first-order and 1 second-order latent constructs (the three key dimensions of structure-related, process-related and output-related constructs and measures and the overarching construct of network performance) (see Figure 2 for a graphical representation of it), following Ullman (2006), we moved towards the estimation of the measurement and structural models, their assessment and modification. We used SPSS and Lisrel to run our analysis.

To estimate the *measurement model*, we used a piecewise jigsaw technique: "we fit pieces of the model individually and then together until we find a coherent whole"

(Bollen 2009, p. 79). More specifically, first of all we checked the fit of each latent construct independently, and then we put together two constructs at a time and checked the fit of each incremental model. The SB chi-square was used for this purpose. The aim was to find the best fit-integrated measurement model with valid and reliable constructs. In this phase, both EFA and CFA were applied, given that "this piecewise technique illustrates (often) blurred distinction between confirmatory and exploratory factor analysis" (Thomson *et al.* 2007). In order to prepare for the next step of the estimation of the structural model, we also considered relations among the latent constructs to avoid misspecification of parameter estimates and "to check whether the fit of the separate models was obscuring spurious or suppressor relations that were missed by treating the factors separately" (Bollen 2000, p. 80).

The specification and re-specification process we followed led us to delete the measures that did not fit with the single latent construct and with the overall integrated model. The CFA conducted us to a final measurement model made up of 3 latent constructs (the three key dimensions of structure-related, process-related and output-related constructs) and 12 measures. Annex 2 reports the final items of the questionnaire for the three structure-, process- and output-related constructs.

The measurement model was acceptable, in terms of both the reliability and the validity analysis. In particular, the average construct reliability was 0.72. The completely standardized estimated parameters (λ) for each measure were high in value and statistically significant (>1.96) and the average AVE of the 3 latent constructs was 0.41. The discriminant validity was also evaluated and checked for each pair of constructs by comparing the AVE of each construct and the correlation of each pair of latent constructs. The fit of the model could be improved by adding correlations among measurement errors, but given the purposes of our study, we preferred to avoid these specifications in favour of model parsimony and understanding of the structural relations among the latent constructs. This study aims to test our theoretical conceptualization using a model with a highly exploratory purpose: it tests a new model for the first time and it does not expect to have perfect new measures. Instead, it seeks to contribute to the development and investigation of the overarching construct of public network performance.

From the measurement model, we moved to consideration of the causal relations among the latent constructs, given our theoretical conceptualization, and estimation of the *structural model*. Our final model (full latent variable model in the structural equation modelling parlance), which takes into account both the measurement and the structural model, is shown in Figure 3.

The final model includes one second-order latent construct (the overarching construct of network performance) that influences the three first-order latent constructs (the three key dimensions of structure-related, process-related and output-related constructs), which in turn are affected by the 12 measures.

The model showed a good fit. Table 3 presents the component fit indices for the model with standardized parameter estimates (γ) of the factor loadings between all of the first-order and second-order latent constructs, their statistics and R^2. All of the γ coefficients are significant (> 1.96) and positive: for every unitary change in performance, the structure-related construct will rise by .92 or the output-related construct will rise by .78, or alternatively the process-related construct will rise by .56. The R^2 indicates the construct variance explained by our model. The second-order construct (the overarching construct of performance) is substantially able to explain the variance of two of the first-order constructs, namely the structure-related ($R^2=.84$) and output-related ($R^2=.61$) ones. The model is less successful in accounting for the variance of the process-related construct ($R^2=.32$).

Table 4 shows the correlation matrix among the three second-order constructs: the process-related construct has the lowest correlation with the other latent constructs.

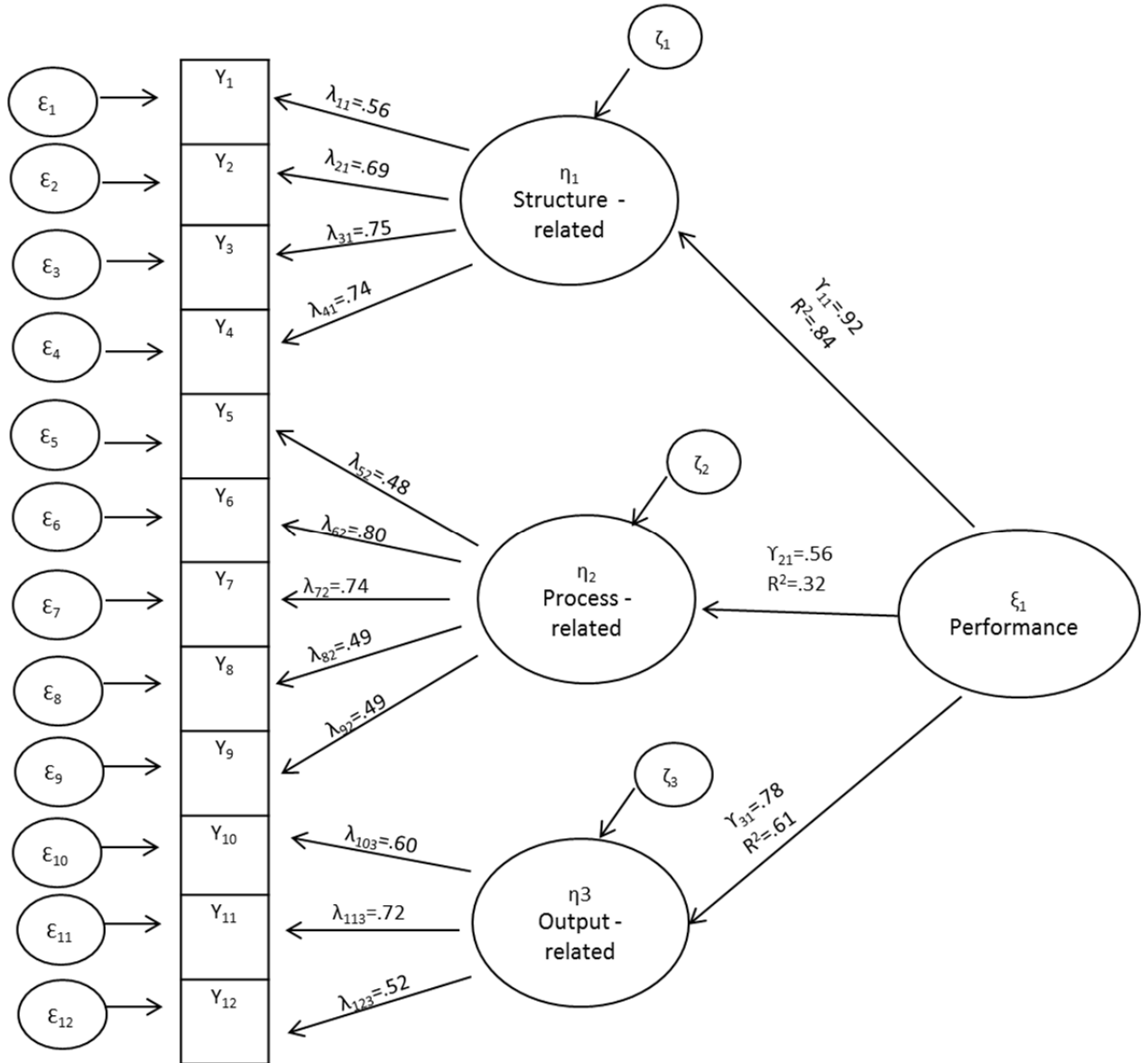FIGURE 3. *Final structural model of network performance*

TABLE 3. *Standardized Gamma Coefficient and R^2 for the Structural Model of Performance*

	Performance Completely Standardize Gamma Coefficient (SE), t Statistics	R^2
STRUCTURE-RELATED	0.92 (0.10), 5.02	0.84
PROCESS-RELATED	0.56 (0.04), 3.16	0.32
OUTPUT-RELATED	0.78 (0.10), 4.23	0.61
Note: N=97		

TABLE 4. *Correlation matrix of Performance and 3 latent constructs*

	PROCESS-RELATED	OUTPUT-RELATED	STRUCTURE-RELATED	PERFORMANCE
STRUCTURE-RELATED	0.52	0.71	1	
PROCESS-RELATED	1			
OUTPUT-RELATED	0.44	1		
PERFORMANCE	0.56	0.78	0.92	1

Note: N=97

Table 5 presents the overall fit indices: SB chi-square is 58.30 and non-significant; RMSEA is below the threshold of 0.80, showing a good fit for the model; SRMR and CFI are acceptable. AGFI is a bit under the accepted threshold.

TABLE 5. *Overall fit measures for the Structural Model of Performance*

Model	Satorra-Bentler Scaled Chi-Square (p)	DF	Chi Square/df	RMSEA (p value for test of close fit)	AGFI	std RMR	CFI
Reflective Second-Order	58.30 (0.22)	51	1.14	.039 (0.64)	0.85	0.077	0.99

Note: N=97

The results from this model suggest that all of the first- and second-order construct loads are positive and statistically significant. The structure-related and output-related constructs have the highest gamma coefficients (.92 and .78 respectively), while the process-related construct has the lowest (.56). R^2 for the measures range from 0.23 to 0.64, R^2 for the structural equation are 0.32 for the process, 0.61 for the output and 0.84 for the structure. The overall fit measures are quite good.

These results highlight an opportunity for further exploration of the role and importance of the process-related construct. In particular, instead of directly contributing to the concept of network performance, the process-related construct could exert a causal relation on the other first-order constructs (structure-related and output-related).

Nested model results

To explore this possibility, we built and confronted nested models. The aim was to explore the process-related direct and indirect effect on structure-related and output-related constructs and to investigate the causal relations exerted by the process-related construct on the other two constructs.

The comparison model was made up of the single direct effects of structure-related, process-related and output-related constructs on network performance. Figure 4 shows the proposed nested models: $\Upsilon_{2i,j1}$ represents the direct effect of the process-related dimensions and $\Upsilon_{11}\beta_{21}$ is its indirect effect. The SB chi-square difference test was used to identify the best fitting model.

FIGURE 4. *Nested models with direct and indirect effect of the process-related construct and the mediation role of the structure-related construct*
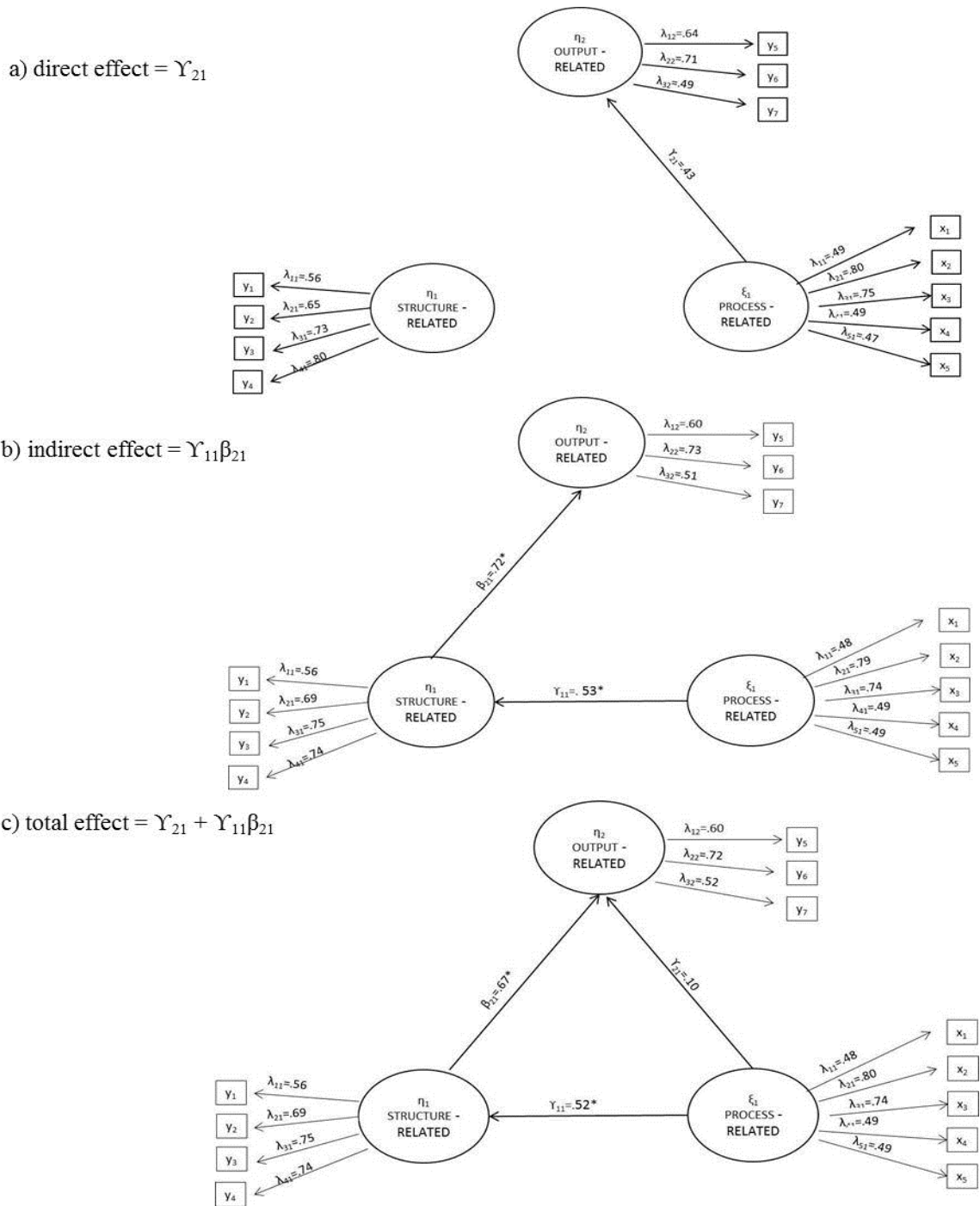
More specifically, we built three alternative nested models and compared their fit indices: the first model (a) was made up of all three constructs and the direct effect of the process-related construct on the output-related one; the second model (b) was made up of the direct and indirect effects of the process-related construct, with the structure-related construct exerting a mediation role; the third model (c) was made up of both process-related direct and indirect effects. Table 6 presents the fit indices of the three alternative models and table 7 shows the results of the SB chi-square difference tests: the second model (b) is the best model, with a significant decrease in the model chi-square compared to the first model (a) and a non-significant decrease compared to the third model (c). The best fit model implies significant causal relations of the process-related construct over the structure-related one and of the structure-related construct over the output-related one.

TABLE 6. *Fits of the three nested models (I)*

Model	ML Chi Square	p	Satorra-Bentler Scaled Chi-Square (p)	P	Chi Square/df	df	RMSEA (p value for test of close fit)	AGFI	std RMR	CFI
a	103.20	0.00	86.32	0.00	1.63	53	0.081(0.059)	0.80	0.18	0.94
b	65.48	0.10	58.70	0.24	1.13	52	0.037(0.66)	0.85	0.08	0.99
c	65.10	0.09	58.30	0.22	1.14	51	0.039(0.64)	0.85	0.08	0.99

TABLE 7. *Comparison of the three nested models (I) - Chi Square difference test*

	scaling correction	Chi difference	df difference	n	p Chi Square difference
a cfr b	5.358	7.040	1	97	0.008
b cfr c	1.058	0.359	1	97	0.548

We also investigated the causal relations in the direct and indirect effects of the process-related construct, with the mediating role of the output-related construct (Figure 5). Following the above procedure, we compared the three nested models with the SB chi-square difference test: the best model is the second one, with the only significant causal relation of the output-related construct over the structure-related one. The process-related construct does not exert a significant relation (Table 8 and 9).

FIGURE 5. *Nested models with direct and indirect effect of the process-relatedconstruct and the mediaton role of the output-related construct*
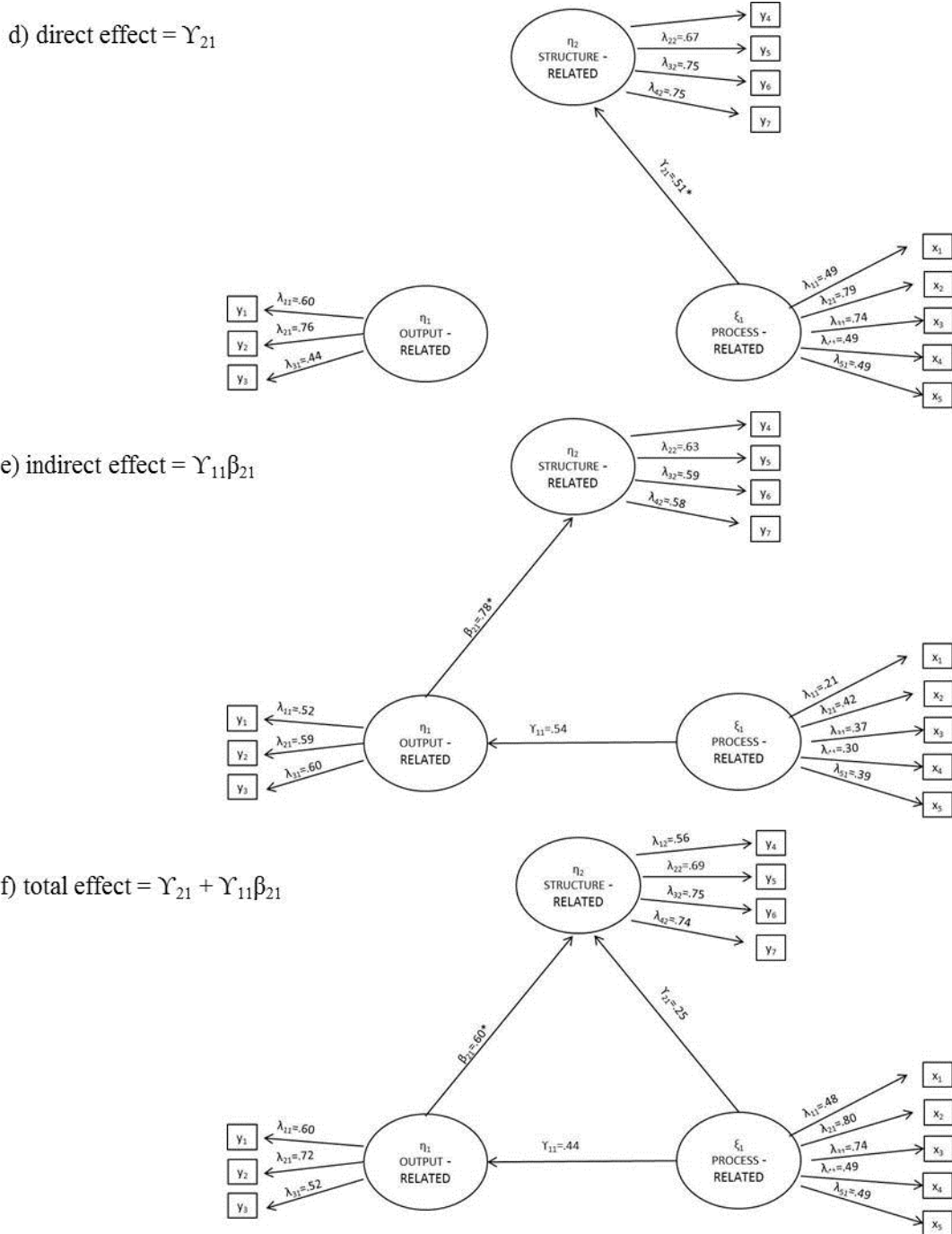

d) direct effect = Υ_{21}

e) indirect effect = $\Upsilon_{11}\beta_{21}$

f) total effect = $\Upsilon_{21} + \Upsilon_{11}\beta_{21}$

TABLE 8. *Fits of the three nested models (II)*

Model	ML Chi Square	p	Satorra-Bentler Scaled Chi-Square (p)	P	Chi Square/df	DF	RMSEA (p value for test of close fit)	AGFI	std RMR	CFI
d	96.38	0.00	80.31	0.01	1.52	53	0.073 (0.12)	0.8	0.16	0.95
e	67.90	0.07	60.30	0.20	1.16	52	0.041(0.61)	0.85	0.08	0.98
f	65.10	0.09	58.30	0.22	1.14	51	0.039(0.64)	0.85	0.08	0.99

TABLE 9. *Comparison of the three nested models (II) - Chi Square difference test*

	scaling correction	Chi difference	df difference	n	p Chi Square difference
d cfr e	5.051	5.638	1	97	0.018
e cfr f	1.605	1.744	1	97	0.187

6. Discussion and conclusion

The existing literature offers us so many different conceptualizations and measurements of network performance that the landscape is confusing and scholars still claim that network performance is not properly defined. Valid and reliable measures to evaluate it have yet to be firmly established (Kenis and Provan 2009; McGuire and Agranoff 2011). In an attempt to wind a skein into a ball, we focused on networks as a whole. Firstly, we systematized the existing literature into a unitary and multidimensional model of network performance. Secondly, we evaluated its construct validity. Structural equation modelling techniques were used for this purpose.

The systematization of the existing studies produced a model for conceptualizing and measuring network performance which was made up of 3 constructs and 40 measures. The first construct conceptualized network performance in terms of a network's ability to maintain its structure and survive in the long term, by gaining a good reputation through internal and external stakeholders. The second construct conceived network performance by focusing on the processual side of network functioning. The third construct conceptualized network performance in terms of a network's ability to produce its expected outputs. The three key dimensions also reflect the difference between the conventional and traditional measures of network performance, referring to network structure and outputs as traditional measures and network processes as innovative measures (Mandell and Keast 2007, 2008).

Following our structural equation modelling analysis, we produced two models in an attempt to improve our conceptualization and measurement of network performance.

In order to assess the model construct validity, we first explored the possibility of integrating the three constructs into the overarching construct of network performance as envisaged in Figure 2. CFA confirmed the presence of an overarching construct of network performance that explained the covariances among the three structure-related, process-related and output-related constructs, and led to a multidimensional model of network performance made up of the 3 constructs and 12 measures: the structure-related construct involved measures of internal and external legitimacy, the process-related construct included measures of interdependence, identification, commitment and development of shared values, and the output-related construct involved measures of efficacy, efficiency and equity.

Although the resulting model had good fit indices, we also observed that for a unitary change in the overarching construct of network performance, the process-related construct had the lower increase, thus indicating that other, unincluded elements may play a decisive role in the variability of the process-related construct. The structure-related construct resulted in a gamma coefficient of .92: the participants in the networks considered internal and external legitimacy to be highly representative of network performance. The output-related construct showed a gamma coefficient of .78, implying that an important role is played by the measures of efficacy, efficiency and equity. The process-related construct resulted in the lowest gamma coefficient .56 and required further analysis.

In order to gain a better understanding of the contribution made by the process-related construct in the conceptualization and measurement of network performance, we subsequently explored the causal relations of the process-related construct on the structure-related and the output-related constructs. We used the chi-square difference tests for the comparison. We compared different alternatives and nested models, and selected the best fit model to represent the contribution of the process-related construct to network performance, as depicted in Figure 4. In particular, we found that the best model to conceptualize and measure network performance involves a process-related impact on the output-related construct through the mediation of the structure-related construct: a unitary change in the process-related construct leads to a .53 (Υ_{11}) change

in the structure-related construct, which leads to a .72 (β_{21}) change in the output-related construct. The indirect effect of the process-related construct on the output-related construct is .38 ($\Upsilon_{11} \beta_{21}$) and the process does not have any direct effect on the output.

From this perspective, the results of our study pave the way for some considerations about how to conceptualize and measure network performance that require further investigation.

Firstly, conceptualizing and measuring network performance seems to be easier than one might think. According to the existing studies (Mandell and Keast 2007, 2008), in order to gain a comprehensive understanding of network performance, it is necessary to combine the process-related measures with the more traditional measures related to the network structure and output. However, the results of our study seem to suggest that those participating in networks pay more attention to the structure-related and output-related constructs of performance. These considerations lead us to a conceptualization of network performance that combines traditional and innovative measures, but mostly supports a traditional approach to network performance: the ability of a network to survive and to achieve its objectives seems to be considered the most important indicator of good performance by clients (as Provan and Milward argued in 1995 and 2001), by network partners (as Provan *et al.* said in 2005) and by those participating in the network, as our study seems to suggest.

Secondly, the process-related measures of network performance appear to have an important impact on network performance, but they seem to be able to do it indirectly, through their influence over the network's structure and output. Developing good collaboration between partners is important for the success of a network, as it can affect the network's ability to survive in the long term, and therefore its capacity to achieve its objectives. These results can be better understood and explained if we take into account two characteristics (or limitations) of our study.

First of all, we focused on service-delivery networks and took into account the points of view of those working for the networks as professionals and administrators. The kind of network under consideration naturally seemed to lead those working for it to pay more attention to the results of the network activity. It may be the case that in policy-networks, where the expected final output is decision formulation and problem solution, developing good collaboration between partners is considered more important,

including by those participating in the network. Further studies could be developed for more in-depth exploration of the impact of the nature of a network on performance measures.

Secondly, we focused on networks in their mature stage of evolution, and many authors have shown the importance of the "impact of changes in time" (Mandell 2008, p. 718) on the measures of network performance, whose adequacy can vary depending on the network's phase of development (Provan and Kenis 2009). In their analysis of the research challenges of network theory, Raab and Kenis (2009) suggested that the temporariness of some networks (Klijn et al. 2010; Kort and Klijn 2011) might moderate "the relationship between certain conditions and the characteristics of networks" (p.208). In long-term networks, along with their evolution and growth, it may be the case that institutionalization processes (Koppenian and Klijn 2004; Kenis and Provan 2008; Mandell and Keast 2008; Provan *et al.* 2009) take place, that the processes governing partner interaction crystallize, become stable and accepted, and that network participants consider the processual side of network functioning as routines that they usually share and ordinarily manage. In this perspective, smooth partner collaboration (in our case, the development of partner inclusion, network identity and unique structural arrangements) could be seen as an objective for networks that are in an early stage of development, but it might be perceived as a routine that requires less attention and effort in consolidated and mature networks. Further investigations could be conducted to look into the relationship between different performance-related measures and a network's stage of development.

As far as the study method is concerned, the model that we proposed must be considered a first attempt to develop a comprehensive measure of network performance, but there are some methodological limitations that must be overcome in order to proceed with the research. Firstly, our study deals with a narrow and non-normally distributed sample. Future studies could enlarge the sample in order to treat missing values in different ways through listwise or pairwise deletion and consider other estimation techniques to assess and improve the validity and reliability of the model. Secondly, the low AVE measures could be improved. Moreover, the jigsaw piecewise technique does not "overcome the problems of having the wrong number of factors" or "provide unambiguous guidance on what to do in the all-too-common situations of an

inadequate model fit"(Bollen 2000, p. 80). Thirdly, future researches with a larger sample size could use a multi-group model to investigate the value given by different respondents (such as professionals and administrative figures) to their idea of network performance. Fourthly, as suggest by one of the anonymous reviewer, further investigations should consider the measure of network performance together with a network analysis of the network itself, in order to obtain a more interesting empirical component of the paper and a richer description of the structure of the network."

Last but not least, one might argue, on the basis of the Simon (1976) argument on the combination of fact and value in assessing the network performance, that "*assessment criteria are elements of value and not elements of fact. Consequently, there is no scientific way to judge whether one criterion is better than another in assessing the performance of a network*" (we are especially grateful to one of the anonymous reviewer for this insight). We agree with this approach and with the argument, highlighted also by Kenis and Provan (2009: 442), that the concept of performance is a normative concept, a choice, an assumption of responsibility that reflects constituents' judgment. Thus we agree with the idea that it is impossible to say *a priori*, once and for all, that one performance criterion is better than another. On the other side, we think that, due to the importance of public networks for policy-making and implementation, attempts to better understand the concept and measures of network performance should be done. Aware of all the limitations of this approach, our paper represents an attempt to go in that direction in a rigorous, detailed and transparent way.

References

Akkerman, A. and Torenvlied, R. 2011, "Managing The Environment. Effects of network ambition on agency performance", *Public Management Review,* 13, 1, 159 – 174.

Anderson, J.C. and Gerbing, D.W 1998, "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin,* 103, 411-23.

Bagozzi, R.P. 1984, "A Prospectus for Theory Construction in Marketing", *Journal of Marketing,* 48, 1, 11-29.

Bollen, K.A. 1989, *Structural Equations with Latent Variables. Wiley Series in Probability and Mathematical Statistics.* New York: Wiley.

Burdenski, T. 2000, "Evaluating Univariate, Bivariate, and Multivariate Normality. Using Graphical and Statistical Procedures", *Multiple Linear Regression Viewpoints*, 26, 2, 15-28.

Byrne, 2009. *Structural Equation Modeling With Lisrel, Prelis, and Simplis: Basic Concepts, Applications, and Programming.* 3rd edn. Mahwah, NJ: L. Erlbaum Associates.

Fornell, C. and Larcker, D.F. 1981, "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research,* 18, 1, 39-50.

Goerdel, H.T. 2006, "Taking Initiative: Proactive Management and Organizational Performance in Networked Environments", *Journal of Public Administration Research and Theory*, 16, 3, 351-367.

Hall, D.T., Schneider, B. and Nygren, H.T. (1970). "Personal Factors in Organizational Identification*", Administrative Science Quarterly*, 15, 2, 176-190.

Head B.W. 2008, "Assessing network-based collaborations. Effectiveness for whom?", *Public Management Review,* 10, 6, 733 – 749.

Herranz, Jr. J. 2010. 'Multilevel Performance Indicators for Multisectoral Networks and Management", *The American Review of Public Administration*, 40, 4, 445-460.

Hooper, D., Coughlan, J. and Mullen, M.R. 2008, "Structural Equation Modelling: Guidelines for Determining Model Fit", *Electronic Journal of Business Research Methods*, 6, 1, 53-59.

Huang, K. and Provan, K.G. 2007, "Resource Tangibility and Patterns of Interaction in a Publicly Funded Health and Human Services Network", *Journal of Public Administration Research and Theory,* 17, 3, 435-454.

Human, S.E. and Provan, K.G. 2000, "Legitimacy Building in the Evolution of Small-Firm Multilateral Networks: A Comparative Study of Success and Demise", *Administrative Science Quarterly,* 45, 2, 327-365.

Huxham, C. and Vangen, S. 1996, "Working together, key themes in the management of relationships between public and non-profit organizations", *International Journal of Public Sector Management,* 9, 7, 5-17.

Hu, L.T. and Bentler, P.M. 1999, "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives", *Structural Equation Modeling,* 6, 1, 1-55.

Isett, K.R., Mergel, I.A., LeRoux, K., Mischen, P.A. and Rethemeyer, R.K. 2011, "Networks in Public Administration Scholarship: Understanding Where We Are and Where We Need to Go", *Journal of Public Administration Research and Theory,* 21, 1, 157-173.

Isett, K.R. and Provan, K.G. 2005, "The Evolution of Dyadic Interorganizational Relationships in a Network of Publicly Funded Nonprofit Agencies", *Journal of Public Administration Research and Theory: J-PART,* 15, 1, 149-165.

Jarvis, C., MacKenzie, S. and Podsakoff, P. 2003, "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research", *Journal of Consumer Research,* 30, 2, 199-218.

Jennings, E. T. Jr. and Ewalt, J. 1998. "Interorganizational Coordination, Administrative Consolidation, and Policy Performance." *Public Administration Review*, 58, 5, 417-428.

Keast, R., Mandell, M.P., Brown, K. and Woolcock, G. 2004, "Network Structures: Working Differently and Changing Expectations", *Public administration review,* 64, 3, 363-371.

Kenis, P. and Knoke, D. 2002, "How Organizational Field Networks Shape Interorganizational Tie-Formation Rates", *Academy of Management Review*, 27, 2, 275-293.

Kenis, P. and Provan, K.G. 2009, "Towards An Exogenous Theory Of Public Network Performance", *Public Administration,* 87, 3, 440-456.

Kiefer, J.J. and Montjoy, R.S. 2006, "Incrementalism before the Storm: Network Performance for the Evacuation of New Orleans", *Public administration review,* 66, Special Issue: Collaborative Public Management, 122-130.

Klijn, E., Edelenbos, J. and Steijn, B. 2010, "Trust in Governance Networks: Its Impacts on Outcomes", *Administration and Society,* 42, 2, 193-221.

Klijn, E.H. and Koppenjan, J.F.M. 2004. *Managing Uncertainties in Networks; A Network Approach to Problem-solving and Decision-making*. London: Routledge.

Kort, M. and Klijn, E. 2011, "Public-Private Partnerships in Urban Regeneration Projects: Organizational Form or Managerial Capacity?", *Public administration review*, 71, 4, 618-626.

LeRoux, K., Brandenburger, P.W. and Pandey, S.K. 2010, "Interlocal Service Cooperation in U.S. Cities: A Social Network Explanation", *Public administration review,* 70, 2, 268-278.

Lindencrona, F., Ekblad, S. and Axelsson, R. 2009, "Modes of Interaction and Performance of Human Service Networks", *Public Management Review*, 11, 2, 191-215.

Long, J.S. 1983, *Confirmatory factor analysis: a preface to LISREL,* SAGE.

Mandell, M.P. 1994, "Managing Interdependencies through Program Structures: A Revised Paradigm", *The American Review of Public Administration,* 24, 1, 99-121.

Mandell, M.P. 1988, "Intergovernmental management in interorganizational networks: a revised perspective", *International Journal of Public Administration,* 11, 4, 393-416.

Mandell, M.P. and Keast, R. 2008, "Evaluating the effectiveness of interorganizational relations through networks", *Public Management Review,* 10, 6, 715-731.

Mandell, M.P. 2001, *Getting results through collaboration: Networks and network structures for public policy and management.* 2001 1st edn, Quorum Books, Westport. Ct.

Mandell, M.P. and Keast, R. 2007, "Evaluating Network Arrangements: Towards Revised Performance Measures." *Public Performance Management and Review.* 30, 4, 574-597.

Mandell, M.P. 2008, "The Theory and Practice of Local Governance and Economic Development" in *Understanding the realities of collaborative networks in the United States*, ed. M Considine and S Giguere, Palgrave McMillan, 79, 63-79.

May, P.J. and Winter, S.C. 2007, "Collaborative service arrangements. Patterns, bases, and perceived consequences.", *Public Management Review,* 9, 4, 479-502.

McGuire, M. and Agranoff, R. 2011, "The Limitations Of Public Management Networks", *Public Administration,* 89, 2, 265-284.

Meier, K.J. and O'Toole, L.J. 2010, "Beware Of Managers Not Bearing Gifts: How Management Capacity Augments The Impact Of Managerial Networking", *Public Administration,* 88, 4, 1025-1044.

Meier, K.J. and O'Toole, L.J. 2003, "Public Management and Educational Performance: The Impact of Managerial Networking", *Public administration review,* 63, 6, 689-699.

Meier, K.J. and O'Toole, L.J. 2001, "Managerial Strategies and Behavior in Networks: A Model with Evidence from U.S. Public Education", *Journal of Public Administration Research and Theory,* 11, 3, 271-294.

Mels, G. 2006, "*LISREL for Windows: Getting Started Guide"*, Lincolnwood, IL: Scientific Software International, Inc.

Meyer, J. P. and N. J. Allen. 1991. "A Three-Component Conceptualization of Organizational Commitment." Human Resource Management Review 1(1): 61-89.

Milward, H.B. and Provan, K. 2003, "Managing the hollow state: Collaboration and contracting", *Public Management Review,* 5, 1, 1-18.

Milward, H.B. and Provan, K.G. 1998, "Measuring Network Structure", *Public Administration,* 76, 2, 387-407.

Milward, H.B. and Provan, K.G. 1998, "Principles for Controlling Agents: The Political Economy of Network Structure", *Journal of Public Administration Research and Theory: J-PART,* 8, 2, 203-221.

Milward, H.B., Provan, K.G., Fish, A., Isett, K.R. and Huang, K. 2010, "Governance and Collaboration: An Evolutionary Study of Two Mental Health Networks", *Journal of Public Administration Research and Theory,* 20, suppl. 1, i125-i141.

Molnar, J.J. and Rogers, D.L. 1979, "A Comparative Model of Interorganizational Conflict", *Administrative Science Quarterly,* 24, 3, 405-425.

O'Toole Jr., L.J. and Meier, K.J. 2004, "Desperately Seeking Selznick: Cooptation and the Dark Side of Public Management in Networks", *Public administration review,* 64, 6, 681-693.

O'Toole Jr., L.J. and Meier, K.J. 2004, "Public Management in Intergovernmental Networks: Matching Structural Networks and Managerial Networking", *Journal of Public Administration Research and Theory,* 14, 4, 469-494.

O'Toole, L.J. 1995, "Rational Choice and Policy Implementation: Implications for Interorganizational Network Management", *The American Review of Public Administration,* 25, 1, 43-57.

O'Toole, L.J. and Meier, K.J. 2006, "Networking in the Penumbra: Public Management, Cooptative Links, and Distributional Consequences", *International Public Management Journal,* 9, 3, 271-294.

O'Toole Jr., L.J.,1997, "Treating Networks Seriously: Practical and Research-Based Agendas in Public Administration", *Public administration review,* 57, 1, 45-52.

O'Toole Jr., L.J., 1996, "Hollowing the Infrastructure: Revolving Loan Programs and Network Dynamics in the American States", *Journal of Public Administration Research and Theory: J-PART,* 6, 2, Symposium on the Hollow State: Capacity, Control, and Performance in Interorganizational Settings, 225-242.

O'Toole Jr., L.J., and Meier, K.J. 1999, "Modeling the Impact of Public Management: Implications of Structural Context", *Journal of Public Administration Research and Theory: J-PART,* 9, 4, 505-526.

Provan, K.G. 1983, "The Federation as an Interorganizational Linkage Network", *The Academy of Management Review,* 8, 1, 79-89.

Provan, K.G., Fish, A. and Sydow, J. 2007, "Interorganizational Networks at the Network Level: A Review of the Empirical Literature on Whole Networks", *Journal of Management,* 33, 3, 479-516.

Provan, K.G. and H. Brinton Milward 2001, "Do Networks Really Work? A Framework for Evaluating Public-Sector Organizational Networks", *Public administration review,* 61, 4, 414-423.

Provan, K.G. and H. Brinton Milward 1995, "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems", *Administrative Science Quarterly,* 40, 1, 1-33.

Provan, K.G. and H. Brinton Milward 1991, "Institutional-Level Norms and Organizational Involvement in a Service-Implementation Network", *Journal of Public Administration Research and Theory: J-PART,* 1, 4, 391-417.

Provan, K.G., Huang, K. and H. Brinton Milward 2009, "The Evolution of Structural Embeddedness and Organizational Social Outcomes in a Centrally Governed

Health and Human Services Network", *Journal of Public Administration Research and Theory: J-PART,* 19, 4, 873-893.

Provan, K.G. and Sebastian, J.G. 1998, "Networks within Networks: Service Link Overlap, Organizational Cliques, and Network Effectiveness", *The Academy of Management Journal,* 41, 4, 453-463.

Provan, K.G., Veazie, M.A., Staten, L.K. and Teufel-Shone, N.I. 2005, "The Use of Network Analysis to Strengthen Community Partnerships", *Public Administration Review*, 65, 5, 603-613.

Provan, K.G. and P. Kenis. 2008. 'Modes of Network Governance: Structure, Management, and Effectiveness', *Journal of Public Administration Research and Theory*, 18, 2, 229–57.

Raab, J. and Kenis, P. 2009, "Heading Toward a Society of Networks", *Journal of Management Inquiry*, 18, 3, 198-210.

Satorra, A. and Bentler, P.M. 1994, "Corrections for Test Statistics and Standard Errors in Covariance Structure Analysis" in *Latent Variable Analysis: Applications for Developmental Research*, ed. Von Eye, A. and Clogg, C., Sage., Thousand Oaks, CA, 399-419.

Satorra, A. and Bentler, P.M. 1988, "Scaling Corrections for Chi-square Statistics in Covariance Structure Analysis", *Proceedings of the American Statistical Association*, 308-313.

Satorra, A. and Bentler, P.M. 2001, "A scaled difference chi-square test statistic for moment structure analysis", *Psychometrika*, 66, 4, 507-514.

Schalk, J., Torenvlied, R. and Allen, J. 2010, "Network Embeddedness and Public Agency Performance: The Strength of Strong Ties in Dutch Higher Education", *Journal of Public Administration Research and Theory,* 20, 3, 629-653.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A. and King, J. 2006, "Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review", *The Journal of Educational Research,* 99, 6.

Steijn, B. Klijn, E. and Edelenbos, J. 2010, "Public-Private Partnerships: Added Value By Organizational Form Or Management?", *Public Administration,* 89, 4, 1235–1252.

Thomson, A.M., Perry, J.L. and Miller, T.K. 2007, "Conceptualizing and Measuring Collaboration", *Journal of Public Administration Research and Theory,* 19, 1, 23-56.

Ullman, J.B. 2006, "Structural Equation Modelling: Reviewing the Basics and Moving Forward", *Journal of personality assessment,* 87, 1, 35-50.

Van Raaij, Denise P.A.M. 2006, "Norms Network Members Use: An Alternative Perspective for Indicating Network Success or Failure", *International Public Management Journal,* 9, 3, 249-270.

ANNEX 1. *Items of the questionnaire*

Construct	Item	Scale; Adapted from
1. Structure-related: network survival- internal/external legitimacy (4 items)	INTLEG1. People working in the network are prepared to continue investing resources (finance, professional competencies, political support, etc.) for the joint provision of homecare services. EXTLEG1. Politicians positively evaluate the homecare service provision. EXTLEG2 Citizens positively evaluate the homecare service provision. EXTLEG3 The mass media positively evaluate the homecare service provision.	No accepted scale given; new scale development based on Mandell and Keast (2008), Human and Provan (2000), Provan and Kenis (2007)
2. Process-related: development of collaboration - interdependence (7 items)	INTER1. Homecare services could not be provided without the contribution of all network partners. INTER2. My organization's activity depends on the activity of the network partners. INTER3. Homecare services could be better provided by a single (public or private) organization. INTER4. Homecare services are provided thanks to the integrated actions of the different organizations involved in the network. CONF1. Very often organizations that collaborate for the provision of homecare services consider the same problems in different ways. CONF2. My organization often clashes with the partner organizations. CONF3. Different points of view among the network partners often generate conflicts.	No accepted scale given; new scale development based on Mandell and Keast (2008) and Keast *et al.* (2004)
3. Process-related: development of collaboration - identification (6 items)	IDET1. When people working in the network talk about the provision of homecare services, they use "we" more often than "I". IDET2. When someone praises the provision of homecare services, people working in the network see it as a compliment. IDET3. If the mass media criticize the provision of homecare services, people working in the network feel personally involved. IDET4. People working in the network are interested in how others judge the provision of homecare services. IDET5. The provision of homecare services must be regular and continuous. IDET6. The goals set for the provision of homecare services are important.	Adaptation from Hall et al. (1970)
4. Process-related: development of collaboration - commitment (10 items)	COMNORM1. People working in the network would like to spend the rest of their careers providing homecare services. COMNORM2. People working in the network see problems connected with the provision of homecare services as their own problems. COMNORM3. People working in the network do not feel they should continue to collaborate for the provision of homecare services. COMEMO1. People working in the network do not feel emotionally involved in the provision of homecare services. COMEMO2. The personal values, purposes and personalities of those working in the network are coherent with the network objectives. COMEMO3. If the values of the people working on the provision of homecare services were different, people working in the network would find their work less interesting. COMEMO4. The goals of the people working to provide	Adaptation from Meyer and Allen (1991)

	homecare services are very important. COMCONT1. It would be very difficult for people working in the network to leave homecare services right now, even if they wanted to do so. COMCONT2. Many things in the lives of the people working in the network would be different if they were to leave homecare services right now. COMCONT3. If people working in the network left homecare services, it would be very difficult for them to find a new job.	
5. Process-related: development of collaboration, development of network organizational-arrangements (shared culture, vision, language and procedures) (10 items)	ORGARR_SH_VALUE1. Homecare services must be accessible to everyone, without any discrimination (in terms of sex, age, nationality, religion, etc.). ORGARR_SH_VALUE2. Homecare services must be weighted to the potential benefit, damage and risk that they could cause to the final user. ORGARR_SH_VALUE3. Homecare services must be provided with respect for the patient's freedom, autonomy and privacy. ORGARR_SH_VALUE4. Homecare services must comply with financial sustainability criteria (cost, efficiency, quality). ORGARR_SH_VALUE5. It is the moral responsibility of professionals to work for the patients' well-being. ORGARR_SH_VALUE6. It is the moral responsibility of professionals not to harm the patients' health or autonomy. ORGARR_SH_VISION1. Very often, organizations that collaborate during the provision of homecare services consider the same problems in different ways. ORGARR_SH_VISION2. Organizations that collaborate during the provision of homecare services have the same feelings about patients' needs. ORGARR_SH_LANG1. People from other organizations that provide homecare services often do not understand my point of view. ORGARR_SH_PROCD1. Organizations that collaborate during the provision of homecare services have shared procedures.	No accepted scale given; new scale development based on Mandell and Keast (2008) and Keast *et al.* (2004)
6. Outcome-related: objective achievement - efficiency/effectiveness/equity (3 items)	EFF1. During the last few years, productivity in the provision of homecare services has increased. EFF2. Considering the quality of the homecare services, the economic resources are well spent. EQU. Homecare services are equally provided to everyone, regardless of their personal characteristics.	No accepted scale given; new scale development based on the definition of network effectiveness at the network level of analysis given by Provan and Milward (2001) and Kenis and Provan (2007, 2009)

ANNEX 2. *Final items of the questionnaire for the constructs: structure-related, process-related and output-related*

Network Structure
INTLEG1. People working in the network are prepared to continue investing resources (finance, professional competencies, political support, etc.) for the joint provision of homecare services.
EXTLEG1. Politicians positively evaluate the homecare service provision.
EXTLEG2 Citizens positively evaluate the homecare service provision.
EXTLEG3 The mass media positively evaluate the homecare service provision.

Network Process
ORGARR_SH_VALUE5. It is the moral responsibility of professionals to work for the patient's well-being.
IDET5. The provision of homecare services must be regular and continuous.
IDET6. The goals set for the provision of homecare services are important.
INTER4. Homecare services are provided thanks to the integrated actions of the different organizations involved in the network.
COMEMO4. The goals of the people working to provide homecare services are very important.

Network Outcome
EFF1. During the last few years, productivity in the provision of homecare services has increased.
EFF2. Considering the quality of the homecare services, the economic resources are well spent.
EQU1. Homecare services are equally provided to everyone, regardless of their personal characteristics.

Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles*

Abstract

This study explores the relationships between network performance predictors and how these jointly affect public network performance. Our aim is to understand how governance forms, coordination mechanisms and managerial roles mutually reinforce each other in achieving successful public networks. The findings of our survey conducted among public networks for the provision of homecare assistance in Switzerland indicate that these elements simultaneously affect network performance. Furthermore, they demonstrate that an organization dedicated to disbursing funds, administrating and coordinating the network requires formal coordination mechanisms as well as network managers with leadership, facilitation and mediation capabilities. The study enriches existing literature investigating different forms of governance and offers useful insights on network performance from both a theoretical and managerial perspective.

1. Introduction

Since Provan and Milward's (1995) seminal study, many authors have investigated how to successfully manage public networks and the structural and managerial determinants that affect their results (McGuire and Agranoff, 2011; Turrini, Cristofoli, Frosini and Nasi, 2010). However, public network scholars have only recently started interrelating these different network characteristics and evaluating how they affect network performance (Cristofoli and Markovic, 2012; Cristofoli and Maccio', 2012; Steijn, Klijn and Edelenbos, 2011). From this literature, we identify and focus on three main predictors of network performance: governance forms, coordination mechanisms and managerial roles. The objective of the present study is to explore the relationships among these three predictors and identify how they jointly affect public network performance. Citing Provan and Kenis (2007), we believe that "the form of network governance adopted and the management of tensions related to that form are critical for explaining network effectiveness" (247). Hence, our aim is to understand how governance forms, coordination mechanisms and managerial roles reciprocally reinforce each other in achieving successful public networks.

We conducted a survey among public networks for the provision of homecare assistance in Switzerland. The findings offer useful insights from both a theoretical and managerial perspective: first, we shed light on how these characteristics simultaneously affect network performance and show that scholars can no longer focus on individual performance predictors but need to look at their joint effects. Second, we contribute to literature investigating different governance modes and demonstrate that a dedicated organization disbursing funds, administrating and coordinating the network requires formal coordination mechanisms and a network manager with leadership, facilitation and mediation capabilities. Third, we support previous articles that argue the need for a certain level of formalization within public networks. Finally, we suggest possible guidelines for professionals: the more a network tightens its governance through defining an ad hoc organization for member coordination and control, the more it requires a network manager and traditional hierarchal coordination mechanisms to ease complexity, manage interdependencies and achieve good performance.

The paper is structured in three sections. The first section reviews extant literature, outlines the conceptual model and proposes six research hypotheses. The second section

describes the methodology and presents the results. The third section discusses the research findings and main theoretical and managerial implications. Finally, the limitations of this study are outlined and future research avenues are indicated.

2. Literature

Studies investigating how to successfully manage public networks can be ascribed to three distinct perspectives focusing on the following predictors of network performance: the configuration of the governance forms for collaboration (Provan and Sebastian, 1998), the coordination mechanisms facilitating partner interaction (Agranoff and McGuire, 2003; Kickert, Klijn and Koppenjan, 1997; E. Klijn, 1996) and the role of the management of the network (Agranoff and McGuire, 2001, 2003; O'Toole and Meier, 2004).

First, the form of governance defines the different mechanisms and degrees of consolidation with which coordination, resource allocation and control among network members are designed. The study of the relationship between governance forms and network performance is relatively recent but its origin resides in the ample literature on the classic structural characteristics of networks - such as integration, centralization, density, size and composition - and their performance (Huang and Provan, 2007; Provan and Milward, 1995; Provan and Sebastian, 1998). Second, in line with interorganizational literature (Grandori and Soda, 1995), we define coordination mechanisms as the variety of tools and methods aimed at maintaining partner cooperation and stable ties. Scholars have investigated and shown the existence of links between these mechanisms (such as the organization of meetings, definition of agendas and procedures) and network performance (Brown, O'Toole and Brudney, 1998; Jennings and Ewalt, 1998; Lindencrona, Ekblad and Axelsson, 2009; Mitchell, Florin and Stevenson, 2002). Third, managerial roles refer to literature investigating the relationship between network performance and the role of the network manager or other institutional bodies in promoting and sustaining interaction among network members, managing conflict, facing and foreseeing changes, building commitment and trust, leading to the achievement of the goals and mission (Agranoff and McGuire, 2001; Huang and Provan, 2007; E. H. Klijn, Steijn and Edelenbos, 2010; Kort and Klijn, 2011; M.P. Mandell, 2001; Meier and O'Toole, 2001; Steijn et al., 2011).

Recent developments call for an integration of these three traditions through understanding how they jointly affect network performance. Provan, Sidow and Fish (2007) view networks as coordination and governance mechanisms and call for research to identify the management mechanisms and the structures that govern networks in achieving their results. In 2010, Turrini et al. encouraged investigating the interaction among contextual, structural, functioning and managerial characteristics of networks and their joint effects on network success.

Accordingly, some new studies have considered the different predictors of network performance. Isett and Provan (2005) identify the need for facilitating structures and managerial frameworks to fulfil key network activities and functions. Governance modes and functioning mechanisms, such as a network administrative organization (NAO) and formal ties, protect network stability from political turbulence and coercive institutional pressures and define a safe and stable organizational environment to achieve network goals. In 2012, Raab and Milward, applying a configurational approach to the Provan and Milward 1995 study, suggested considering the combination of structural characteristics and network functioning, paying particular attention to the managerial role of network leaders and facilitators. Cristofoli and Maccio' (2011) sustain that different network structures require different mechanisms and managerial capabilities to ensure network success. Cristofoli, Markovic and Meneguzzo (2012) consider the joint effect of network managers, governance forms and mechanisms on network performance and conclude that the success of shared-governance structures can be ensured by network administrators and coordination mechanisms. Cristofoli and Markovic (2012) shows that the main predictors of network performance (namely, network structure, functioning mechanisms, managers and context) are neither a necessary nor a sufficient condition for the success of a network, only a combination of these can lead to better results.

Following this research path, our paper investigates the direct and joint effects of governance modes, managerial and functioning characteristics on public network performance. We believe it is also important for scholars and practitioners to analyse how network success is affected by the broader implication of these effects. In fact, existing studies advocate possible links between different governance forms and network performance (Isett and Provan, 2005; Provan and Milward, 2001; Provan et al.,

2007), but we do not know if different governance modes require distinct managerial and functioning mechanisms. Some authors indicate that mechanisms (Brown et al., 1998; Jennings and Ewalt, 1998; Lindencrona et al., 2009; Mitchell et al., 2002) and managerial roles (Agranoff and McGuire, 2001; Kickert et al., 1997; Kort and Klijn, 2011; Mandell. M.P., 2001; Meier and O'Toole, 2001; Provan et al., 2007; Steijn et al., 2011) affect network performance, while others (Steijn et al., 2011) link the two, suggesting managerial roles to select and use appropriate managerial tools. However, their unique and joint effects on network performance are still poorly understood. Finally, the causal relationships between these three main factors could provide important guidelines for successful public networks and enhance understanding of the concept of public network performance.

The figure below shows the conceptual model developed in this paper and presented in detail in the following sections.

FIGURE 1. *The conceptual model*
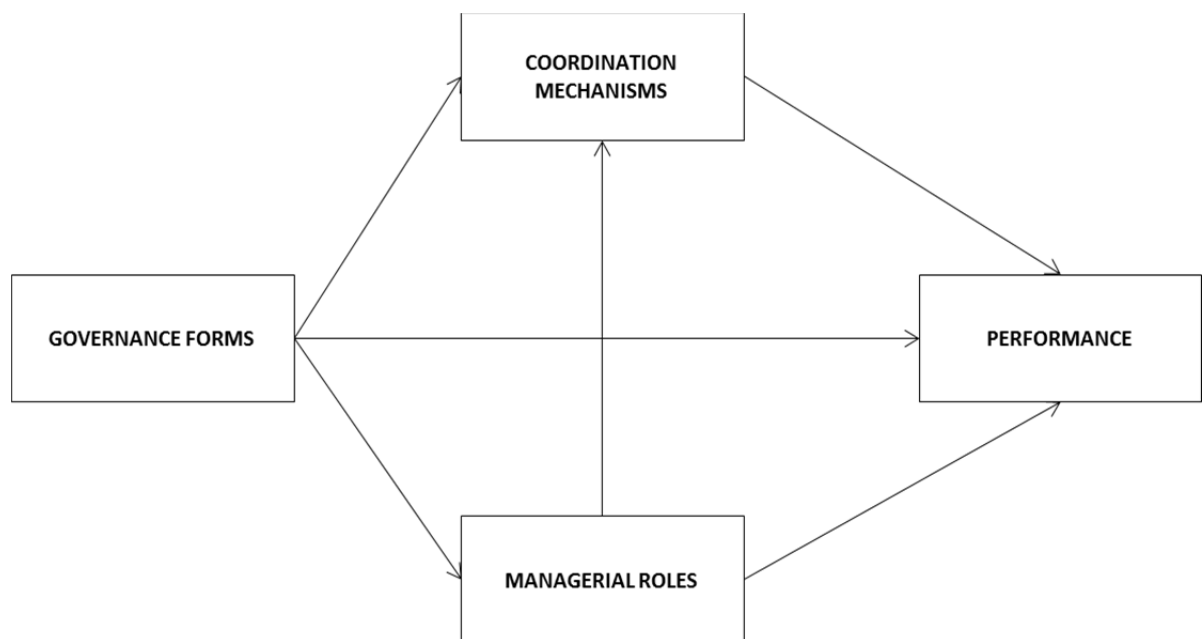
3. Research hypothesis

Based on the aforementioned conceptual model, the following section outlines the research hypotheses. First, we specify our dependent concept and thereafter investigate the other elements and their effects on network performance.

Performance

Network performance is a recognized theme in public network studies but is still a contradictory and at times blurry matter. A variety of labels, concepts and measures have been proposed, suggesting not only the complexity but also the crucial importance of the issue. Kenis and Provan (2009) call for a multi-constituency approach to network performance where any definition and criteria can be legitimate but need to be defined appropriately, respecting the main network characteristics and research goals. McGuire and Agranoff (2011) also discuss the multi-dimensionality of this concept and the inappropriateness of traditional output-outcome measures typical of hierarchical organizations. Cristofoli and Maccio' (2012) systematize the proposed conceptualizations and measures of network performance (in terms of network effectiveness or network success) into a multidimensional model and find different levels of analysis and measurement approaches. First, performance can be defined according to three distinct levels of analysis: the "partner organizations" level refers to the benefits for member organizations that monitor and fund network activities; the "whole network" level takes into account the benefits for those working for the network as administrators or service-level professionals; the "community" level instead considers the results for customers served by the network itself. Second, network performance can be measured according to its structure, process and output: from the structural perspective, networks can be considered successful when they are able to survive in the long term. Authors considering processes-based measures evaluate network results in terms of the ability to create both inclusion and collaboration. Finally, from the output-based perspective, network performance refers to traditional concepts of efficacy, efficiency and equity and reflects the ability of the network to achieve its goals.

Given this plethora of approaches and studies of the definition and measurement of network performance, in this paper we aim to identify the benefits for those working within the network as administrators and professionals (the so-called "whole network" level of analysis) and define network performance as the ability of a network to survive and achieve its objectives (Isett and Provan, 2005; Provan and Milward, 1995; Provan and Milward, 2001). According to this perspective, successful public networks can endure, improve over time and fulfil their goals.

Governance Forms

Form of governance is a key element in managing network complexity and "involves the use of institutions and structures of authority and collaboration to allocate resources and to coordinate and control joint actions across the network as a whole" (Provan and Kenis, 2007: 231). Only recently, literature has started focusing on network governance modes, how they are maintained and governed and how they can affect the performance of the whole network.

Provan and Kenis (2007) identify three main forms of network governance on a continuum from a non-brokered and loose form to a brokered, tight and externally governed form. At one extreme, shared/participative governance is the simplest form of governance: participants, as a group, govern the network without a representative and separate entity. All network members are jointly responsible of network functioning and management through formal and informal mechanisms to manage and ensure their participation. Commitment is the key word: shared governance requires the involvement of all members in the network goals and the ability to organize governance processes based on equal interaction and symmetrical powers. On the other extreme, network administrative organization is the most elaborate form of governance: a fully centralized and ad hoc network administrative organization is responsible for organizing and managing internal and external relations. The NAO is established by network members and has the unique role of managing, coordinating and brokering the network governance. The NAO is not conceived as a network member since it does not provide any service but is the enabler of interactions, activities and decisions within the network. Between these two extremes, the lead administrative agency has a highly brokered but internal-participative governance form: a core and legitimized member of the network becomes the lead organization that, in addition to providing network services, also administers and supports network activities and its functioning.

This continuum clearly shows the strengths and weaknesses (Nolte and Boeing, 2011; Provan and Kenis, 2007) of each governance form and the effect on the performance of the whole network. In shared/participative governance, involvement and flexibility coexist with coordination complexity and an efficiency-efficacy trade-off while in NAO, legitimacy, reduced complexity and efficiency coexist with bureaucratic and rigid decision-making processes. Consequently, shared governance is considered

more effective in small networks and simple environments where informal and flexible interactions are more likely. To the contrary, a lead organization and NAO tend to be more effective for large and complex networks that require high levels of coordination, have substantial interdependent task requirements and specific competencies to ensure collaboration. Particularly in multifaceted, mandatory and public-funded networks, the NAO is responsible for network growth and maintenance. Following principal-agent theory, Provan and Milward (2001) consider this as solving the principal-agent conflict "in its key role as disseminator of funds, administrator and coordinator of the network, in an agency-theory context, the NAO is both the agent of the community and the principal of the network participants" (Provan and Milward, 2001: 418). It prevents service duplication and competition among network members in favour of the success of the overall network. Huang and Provan (2007) also affirm that the need for service coordination and cost control implies defining tight forms of governance. Finally, Isett and Provan (2005) clearly state the link between NAO and network performance: "NAOs perform facilitative and intermediary roles to organize services in a way that contributes to the effectiveness and sustainability of the system as a whole" (p.161). Provan and Milward (2004:18) sustain that "powerful NAOs that are centrally integrated facilitate effective network performance". Hence our first hypothesis:

H1: Tight governance forms lead to better performance at the network level.

Coordination Mechanisms

Studies on coordination in network settings (Agranoff, 2006; Morris, Morris and Jones, 2007) call for an integration of the main theoretical approaches, namely, the classical hierarchical and network-based coordination approaches. The classical hierarchical approach has its root in Taylor's bureaucracy and requires coordination based on definite connections, distinct positions and authority functions, hierarchical mechanisms, task specialization, routines and rules. The network-based approach, to the contrary, recognizes the need to manage network interdependences with flexible and adaptable tools as well as negotiation and mutual adjustment mechanisms. According to Agranoff (2006: 58), "networks are different from organizations but not completely different"; networks are non-hierarchical systems of interdependent actors that require a combination of bureaucratic and network-based organizational mechanisms to ease and improve their coordination.

In the following, we refer to the bureaucratic approach and define coordination mechanisms as all the formalized methods and tools used to sustain partner interaction (Jennings and Ewalt, 1998). Many management and public management scholars indicate the presence of a relationship between these mechanisms and network performance (Grandori and Soda, 1995). In general, formalized coordination mechanisms would seem to positively affect network performance (Jennings and Ewalt, 1998; Lindencrona et al., 2009; Mitchell et al., 2002). Hence, tools such as the organization of meetings, the definition of agendas and the establishment of procedures for partner interaction and decision-making processes (such as steering groups) influence the performance of the whole network. However, this relationship would seem to be subjected to the effects of the structural characteristics of the network itself: the level of network integration enhances the relationship between formalized coordination mechanisms and performance (Conrad et al., 2003; Jennings and Ewalt, 1998; Mitchell et al., 2002). Jennings and Ewalt (1998) refer to the "effects of coordination and consolidation" (p.425); if coordination tools only have a marginal role in network outcome, the joint effect of coordination mechanisms and centrally integrated network structures positively and substantially affects network results. Other authors (Huang and Provan, 2006; Isett and Provan, 2005) affirm that complex networks with an NAO governance form require high levels of formal coordination "because of the need to manage the complexity of coordination across the many organizations that constitute the network" (p.161); through proper traditional coordination mechanisms, tight governance modes can foster member interaction, obligation and conflict resolution. Hence, we propose:

H2: Tight governance forms lead to a high level of formal coordination mechanisms.

H3: A high level of coordination mechanisms leads to better performance at the network level.

Managerial roles

According to Steijn et al. (2011), managerial roles refer to the unique network manager or the set of institutional bodies/roles that initiate and support interaction among members, solve and manage conflict and changes, lead the network towards its goals and mission, build trust and commitment by selecting and making use of

appropriate managerial mechanisms. We consider both the unique network manager and set of institutional bodies/roles following Cristofoli and Maccio' (2011), who indicate in their study that public networks are managed by multiple roles. Hence, in the following sections we will use the term 'managerial roles' taking into account the complexity and multi-actor configurations in managing public networks.

Studies focusing on the different abilities and functions of these managerial roles suggest that the network manager or the set of institutional bodies can facilitate, mediate and lead the network (Agranoff and McGuire, 2001; Agranoff and McGuire, 2003; Shortell et al., 2002). Facilitating the networks refers to the ability to create (and redefine, if necessary) an institutional environment, to favour and sustain partner interaction and define (and change) network arrangements (Agranoff and McGuire, 1998; 2001; Hageman, Zuckerman, Weiner, Alexander and Bogue, 1998; Kickert et al., 1997; E. H. Klijn and Koppenjan, 2004; McGuire, 2002; O'Toole and Meier, 2004; 1997; Weiner, Alexander and Zuckerman, 2000). These competencies focus on the management of network processes and the need for agreed places and times, appropriate spaces, notes and minutes of meetings (Susskind and Cruikshank, 1987). Mediating refers to the ability of the managerial roles in supporting network success, resolving tension among partners through bargaining and negotiation (Agranoff and McGuire, 2001; Kickert et al., 1997; Shortell et al., 2002). Managerial roles operate in critical situations and have the ability to reconcile or restructure existing network relations (Kickert et al., 1997). Finally, network leadership requires action planning (Agranoff and McGuire, 1998), activating actors and resources for the network (Agranoff and McGuire, 1998; E. Klijn, 1996; McGuire, 2002), mobilizing members, consensus building and commitment to common objectives (Agranoff and McGuire, 2001; Mandell and Keast, 2008; McGuire, 2002).

Many studies argue that managerial roles and their skills have a positive effect on network performance. Meier and O'Toole (2001) claim that managerial roles that are able to actively manage network interdependencies aid network performance. Steijn et al. (2011) and Kort and Klijn (2011) demonstrate that the number of managerial strategies employed has a strong and positive effect on the results of public-private partnerships.

Moreover, Provan and Kenis (2007) maintain that managerial roles are affected by and depend on network governance forms: "different governance forms place a different burden on network members to provide these competencies" (p.240). Hence, tight governance forms characterized by high managerial complexity (Isett and Provan, 2005) require a great concentration of managerial abilities and skills.

Finally, some authors (Klijn et al., 2010; Steijn et al., 2011) consider the selection and use of proper managerial tools as a critical managerial skill. Network managers should be able to lead their members by "creating and changing network arrangement for better coordination" (Agranoff and McGuire, 2001b: 676) and, in complex governance forms, should take advantage of appropriate formal coordination mechanisms. Hence, we propose:

> *H4:* The presence of a network manager will lead to better performance at the network level.
>
> *H5:* Tight forms of governance will lead to the presence of a network manager.
>
> *H6:* The presence of a network manager will lead to a high level of formal coordination mechanisms.

4. Methodology

To evaluate the above model, we collected data through a survey and analysed these with structural equation modelling.

Sample and Data Collection. The unit of analysis of our study is the network as a whole (Isett, Mergel, LeRoux, Mischen and Rethemeyer, 2011; Isett and Provan, 2005; Kenis and Provan, 2009; Provan et al., 2007) while the empirical setting is public networks for the provision of homecare assistance in Switzerland.

We chose Switzerland because collaboration in the provision of public services is widespread: over 60% of Swiss municipalities take part in service delivery networks (Steiner, 2000; 2003) and we chose public networks for the provision of homecare assistance since collaboration reaches its peak with 69% of Swiss municipalities involved in these networks (Steiner, 2000; 2003).

Created at the beginning of 2000, these networks provide healthcare and social services at home for the elderly, single parents, people with disabilities or other disadvantaged social groups. They involve the collaboration of the Cantonal Government and municipalities that fund and control the network activities with a

central organization that provides homecare services and activates different non-profit organizations for the provision of complementary services such as public transport, day and night-time assistance. According to some studies (Cristofoli and Maccio', 2011; Cristofoli et al., 2012; Cristofoli and Markovic, 2012) these networks are highly heterogeneous with different modes of governance and with formal coordination arrangements of differing strengths. Not all the networks have a network manager or other institutional bodies that lead and support member interaction and coordination.

First, we developed a pilot study: a group of 6 network directors and public network scholars was asked for feedback on the unambiguousness of the items and perceived association with their idea of network performance, governance forms, coordination mechanisms and managerial roles. Most questions were considered easily understandable and coherent while others needed rewording, consistently with the specific terminology used by network members.

Second, the revised questionnaire was translated into the three Swiss national languages (German, French and Italian) and administered to 523 public networks, in both paper and internet-based formats. More specifically, each network (director) was contacted by email or phone stating the study objectives and methodology. They were given information on the research project, were asked if they would be willing to participate in the project and to give their contact details. 523 out of the population of 575 public networks gave their approval. Two reminders were later sent to non-respondents in an attempt to increase the response rate.

We collected 209 responses, equal to a response rate of around 40%. The characteristics of this sample of 209 networks are reported in Table 1.

TABLE 1. *Sample characteristics*

GEOGRAPHICAL AREA	87.60%	German-speaking Cantons
	12.40%	French- speaking Cantons
LEGAL STATUS	76.80%	Association (Private Law)
	6.70%	Foundation (Private Law)
	17.22%	Municipal Department (Public Law)
CATCHMENT AREA (2011)	1600.00	Minimum
	720'000.00	Maximum
	25'414.71	Mean
	65'944,03	Std. Deviation
NUMBER OF CLIENTS PER YEAR (2011)	16.00	Minimum
	29'000.00	Maximum
	707.79	Mean
	2'445.08	Std. Deviation
NUMBER OF FULL-TIME EQUIVALENTS (2011)	1	Minimum
	4'585.00	Maximum
	91.28	Mean
	399.40	Std. Deviation
NIUMBER OF SERVICES PROVIDED (selected from the following list: Care, Household, Meals, Nursing home, Transport, Equipment rental, Ergo therapy, Pedicure, Coiffure, Voluntary visitors, Child services, Health counseling (Diabetes, Nutrition, Stoma), Social counseling, Parents services, Night-care, Weekend-care, Palliative Care, Preventive Care, Joint Care, Telemedicine, Help on the phone, One-stop shop, OTHER)	3.00	Minimum
	21.00	Maximum
	11.35	Mean
	4.26	Std. Deviation
N=209		

Measures. No recognized measurement scale for *governance modes* has been used and tested by literature and we hence created a new 5 item-scale (Cronbach Alpha= 0.879). First, we started from Provan and Kenis' (2007) definition of the three different governance forms, namely, shared governance, lead organization and network administrative organization. Shared governance is defined as decentralized networks governed by the network members themselves on a relatively equal basis "with no separate unique governance entity" (Provan and Kenis, 2007: 234); lead organization refers to the situation where "all major network-activities and key decisions are coordinated through and by a single participating member" (Provan and Kenis, 2007: 235); NAO concerns "a separate administrative entity set up specifically to govern the network and its activities" (Provan and Kenis, 2007). From these definitions and from

literature (Kenis and Provan, 2009), we classified the main activities performed by these three governance forms as coordinating, administering and organizing the network of the partner organizations; contacting and activating the partner organizations; stimulating interaction within the network of partner organizations. Finally, we asked for indications on those responsible for any of these activities within the network on a scale of 1 to 7 (1 equal to ALTOGETHER; 4 equal to HOMECARE LEADER; 7 equal to ADMINISTRATIVE AGENCY). We opted for a 1-7 scale in order to take into account those situations and perceptions of activities that although not belonging to a specific mode of governance (as defined by literature) implied a degree of different governance forms.

Coordination mechanisms were evaluated with a 3-item scale (Cronbach Alpha= 0.761) developed taking into account both literature definitions of coordination tools and mechanisms (Jennings and Ewalt, 1998; E. Klijn, 1996) and the Cristofoli and Maccio' (2011) case study. Finally, using a scale from 1 to 7 (1 equal to "I totally disagree" and 7 equal to "I totally agree"), respondents were asked to specify the extent to which the network relied on formal coordination mechanisms such as regular meetings and standards operating procedures.

Managerial roles were evaluated with 5 items (Cronbach Alpha= 0.869) to define who normally performed the different activities within the networks. We first identified the main activities, skills and capabilities that those who lead and govern public networks should undertake/have according to literature (Agranoff and McGuire, 1999; Agranoff and McGuire, 2001; Kickert et al., 1997): solving conflicts among partner organizations; acting as a mediator and broker (of interests and points of view); forging agreements among partner organizations; leading all partner organizations towards a common objective. Thereafter, we asked who normally undertook these functions within the network using a scale of 1 to 7 (1 equal to NOBODY; 4 equal to INSTITUTIONAL BODIES; 7 equal to SPITEX DIRECTOR). As to the governance forms, we opted for a scale of 1 to 7 to include the dispersion of managerial roles.

Referring to the results of the Cristofoli and Maccio' (2012) study on network performance, we measured *network performance at the network level* considering the so-called output–related and structure–related measures of performance. In detail, following Provan and Milward (2001), we used the definition of performance at the

network level and the subjective measures (such as an increase in the range of services provided, the integration/coordination of services and the strength of the relationships) defining a 4-item scale (Cronbach Alpha= 0.869). Thereafter, we asked the networks to determine the extent to which they agreed with our statements on a scale of 1 to 7 (1 equal to "I totally disagree" and 7 equal to "I totally agree").

Control variables. In testing for our hypotheses, we controlled for several variables that may affect network performance. First, we controlled for the resources munificence and the number of external controls of networks to take into account the effects of the context on network performance (following Provan and Milward, 1995). Resources munificence is measured as the percentage of public funds received by the network. In order to evaluate external controls, we defined a list of 6 main external controls; respondents were asked to identify their own external controls and to add those not included in the "others" box. Finally, we controlled for network size by asking each respondent to indicate the number of network members.

The full list of items, sources and scales are reported in Appendix A.

Data analysis: structural equation modelling. Structural equation modelling explains "the variation in a set of observed variables in terms of a set of unobserved variables" (Long, 1983: 22). Unobserved variables (or latent constructs) are abstract phenomena that cannot be directly observed (in our case, governance forms, coordination mechanisms, managerial roles and performance at the network level). Observed variables are the (manifest) indicators that are believed to represent (based on theoretical considerations) the unobserved variables and render these measurable (in our case, the items of the questionnaire designed to measure the former latent constructs).

The structural equation model is composed of two different but strongly interconnected models: a measurement model (Confirmatory Factor Analysis - CFA) and a structural model (SEM). The measurement model (CFA) focuses on the relationships between latent constructs (governance forms, coordination mechanisms, managerial roles and performance at the network level) and their observed measures (the items of the questionnaire). The objective is to define how each measure weighs on its related construct and to explore each construct's reliability and validity. The structural model focuses on the causal relationships between the latent constructs. A model is defined as a full latent variable model when it integrates both the measurement

and the structural model: it represents the relationships between latent constructs and measures, and the causal relations among latent constructs.

Figure 2 shows our hypothesized full latent variable model with the system of structural equations linking latent constructs and latent constructs to their measures, according to the former conceptual model.

FIGURE 2. *The hypothesized full latent variable model*
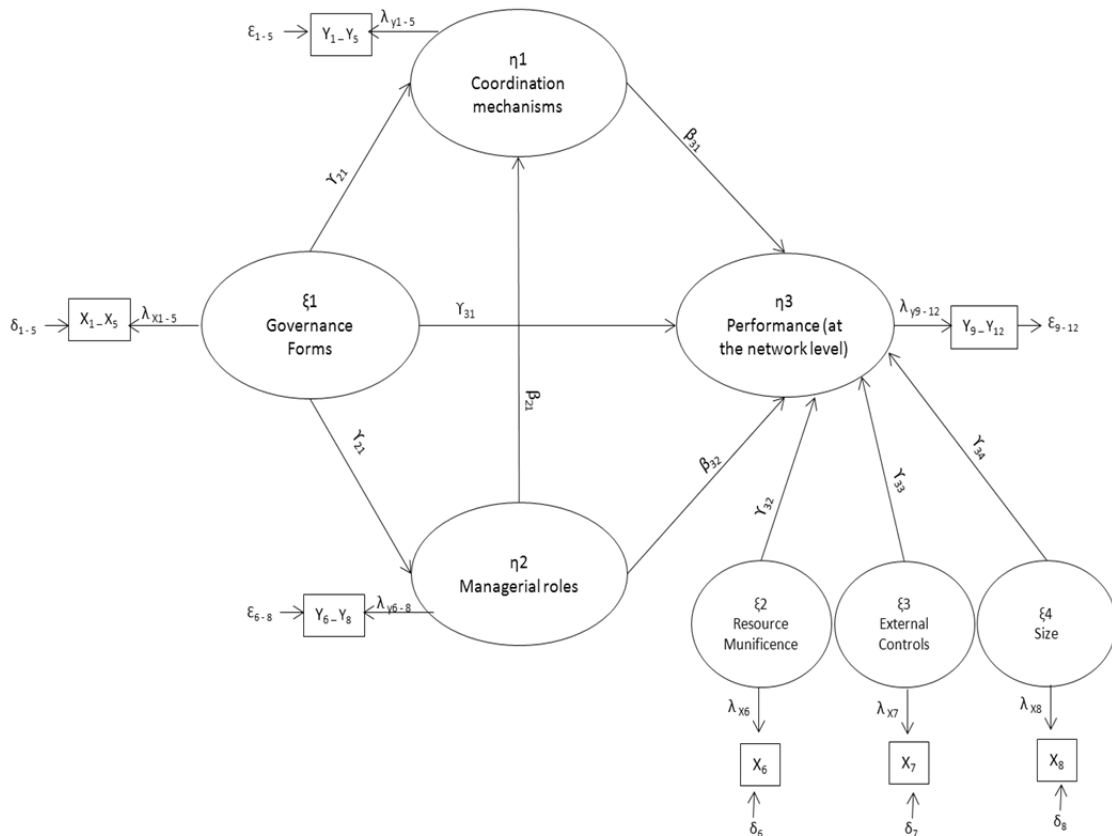
To test our model, we firstly estimated and thereafter evaluated it. Estimation identifies the best model to minimize "the difference between the structured and unstructured estimated population covariance matrices" (Ullman, 2006: 46). The ML (Maximum Likelihood) test is the most common method to compare alternative models, but dealing with non-normally distributed data, we opted for the ML estimation with the Satorra-Bentler scaled chi-square (Satorra and Bentler, 1988; 1994; 2001) (SB chi-square), also known as Robust Maximum Likelihood.

Evaluation instead assesses the fit of both the measurement and structural models.

Evaluation of the measurement model implies assessing the reliability, convergent validity and discriminant validity of each latent construct. To assess the construct

reliability, we used an index of composite or construct reliability (Fornell and Larcker, 1981) ranging from 0 to 1 (cut-off at 0.70). The convergent validity of single constructs was evaluated with the estimated parameters for each observed construct (which should be high in value and statistically significant – R2 acceptable) (Anderson and Gerbing, 1998) and the analysis of the Average Variance Extracted (AVE) (which should be above .50) (Fornell and Larcker, 1981). To evaluate the discriminant validity for each pair of latent variables, we looked at the AVE of each construct, which should be higher than the correlation between the two latent constructs (Fornell and Larcker, 1981). Finally, we considered common method bias and evaluated the systematic measurement error that is "a particularly serious problem because it provides an alternative explanation for the observed relationships between measures of different constructs that is independent of the one hypothesized" (Jarvis, MacKenzie and Podsakoff, 2003: 879). The different techniques for controlling common method bias (Jarvis et al., 2003) include ex-ante procedural remedies that affect the survey design and, for instance, involve the use of multiple sources and the temporal, proximal, psychological, or methodological separation of measurements; ex-post statistical controls mainly imply controlling for the effects of a (single or multiple) method factor.

Evaluation of the structural model implies the use of multiple tests to assess the fit of the overall model since there is no consensus among academics on the best test. In particular, we used (Hooper, Coughlan and Mullen, 2008; Hu and Bentler, 1999) the (SB) chi-square, which requires a statistically non-significant result at a 0.05 threshold level for a good fit (given its sensitivity to the sample size, researchers have provided alternative indices such as the relative/normed chi-square that is chi-square/df, which should range from 1 and 3); the Root Mean Square Error of Approximation (RMSEA), which should range between 0.08 and 0.10 for a mediocre fit and below 0.08 for a good fit; the Standardized Root Mean Square Residuals (SRMR), which can go from 0 to 1, with values below 0.08 considered acceptable; and the Comparative Fit Index (CFI), which ranges from 0 to 1 and recommends that values for a good fit should be above 0.95. We did not apply Goodness of Fit (GIF) or Adjusted Goodness of Fit (AGIF) since current consensus considers these to be affected by sample size (Sharma et al. 2005).

Analytical Procedure and results

Data screening. We started our analysis by checking the adequacy of our sample of 209 cases. We found violations of both univariate and multivariate normality. Since the distribution is non-normal, we opted for the Satorra-Bentler scaled statistics (Robust Maximum Likelihood) which, as previously explained, adjusts the model chi-square and standard error estimates by a scaling factor based on the data's non-normality (Byrne, 1998).

Reliability, Validly and Common Method Bias. We estimated and assessed the model with the SPSS and Lisrel program.

CFA was applied to estimate the measurement model. This showed the model is acceptable in terms of reliability and validity analysis (see Appendix A). In particular, the construct reliabilities were all above the 0.70 cut-off (0.87 for Governance Form constructs; 0.77 for Coordination Mechanisms; 0.87 for Managerial Roles and 0.84 for Network Performance). The completely standardized estimated parameters (λ) for each measure are high in value and statistically significant ($t > 5.92$) and the AVE of the 4 latent constructs are above 0.50 (Governance Forms AVE= 0.58; Coordination Mechanisms AVE= 0.54; Managerial Roles AVE= 0.57; Performance at the network level AVE= 0.57). The discriminant validity was also evaluated and confirmed for each pair of constructs by comparing the AVE of each construct and the correlation of each pair of latent constructs. Table 2 shows the correlation matrix and the descriptive statistics of these measures.

Considering the use of self-reported data obtained from the same source (we only used the national database of the Swiss Federal Statistical Office (FSO) to collect the percentage of public funds), common method bias concerns needed to be addressed. First, the survey was designed to try and prevent common method bias problems: following Jarvis et all. (2003), we used different scale labels and, hence, defined different response settings. Second, we checked for common method bias with Harman's single factor test and the more rigorous CFA, controlling for the effects of a single unmeasured latent method factor (Jarvis et al., 2003). We found the common method bias to be acceptable (Williams, Buckley and Cote, 1989) accounting for 10.16% of the total model variance.

TABLE 2. *Correlation matrix and descriptive statistics*

		1	2	3	4	5	6	7
1	GOVERNANCE STRUCTURE	1.00						
2	COORDINATION MECHANISMS	.03	1.00					
3	MANAGERIAL ROLES	.25**	.26**	1.00				
4	PERFORMANCE (AT THE NETWORK LEVEL)	.02	.29**	.18*	1.00			
5	Resource Munificence	.04	.07	.01	-.09	1.00		
6	External Control	-.20**	.01	-.05	.07	.23**	1.00	
7	Size	-.12	.16*	.08	.19**	.27**	.25**	1.00
	Mean	3.09	4.67	4.25	5.70	.42	3.07	1.97
	Standard Deviation	1.46	1.62	1.69	1.07	.08	1.22	1.26
	Skeweness	.18	-.56	-.29	-.94	.05	.02	1.86
	Kurtosis	-.46	-.64	-.69	.88	-.20	-.43	3.96
	n. of item	5	3	4	5	1	1	1

*p<0.05; **p<0.01: ***p<0.001 (two tailed test). N=209

Results. From the measurement model, we proceeded to test the hypotheses among the latent constructs in view of our theoretical conceptualization. Our final model (full latent variable model in structural equation modelling parlance), which takes into account both the measurement and the structural model, is shown in Figure 3 below.

FIGURE 3. *Results of Structural Equation Modelling Analysis (completely standardized coefficients and t-values in parentheses)*
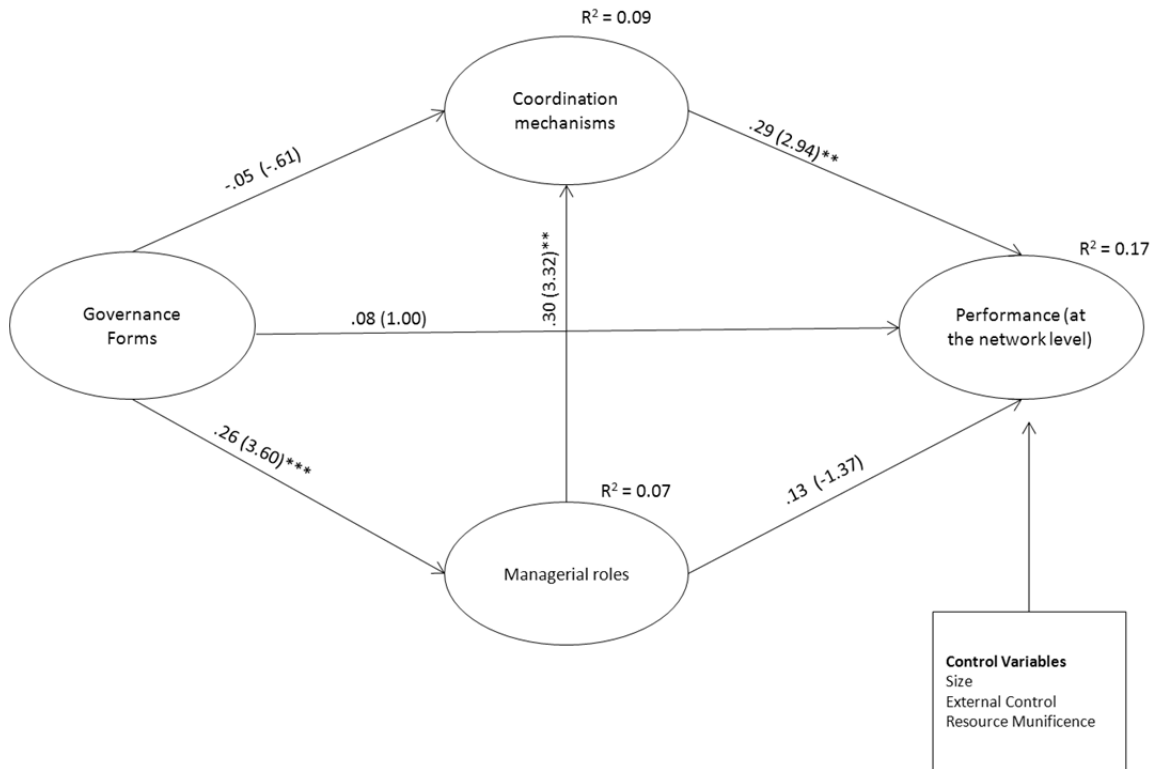
*p<0.05;**p<0.01: ***p<0.001 (two-tailed test). N=209

The model shows good fit. Table 3 presents the overall fit indices: SB chi-square is 279.84; the Chi Square/df ratio is acceptable; RMSEA is below the threshold of 0.80; stdRMR, NNFI and CFI are adequate.

TABLE 3. *Overall fit indices*

ML Chi Square	SB ML Chi Square	p	Chi Square/df	DF	RMSEA (p value for test of close fit)	std RMR	NNFI	CFI	GFI
320.27	279.84	0.00	2.03	158	0.061(0.064)	0.062	0.94	0.95	0.87*

Note: N=209

As reported in Table 4, governance forms have no significant direct effect on performance at the network level and on coordination mechanisms: H1 and H2 need to be rejected. However, governance forms have a positive and significant effect on the managerial role construct, leading us to accept H5. Managerial roles themselves show a positive and significant effect on coordination mechanism and a non-significant direct effect on performance at the network level: H6 is confirmed while H4 is rejected. Finally, coordination mechanisms have a positive and significant effect on network performance, confirming H3.

TABLE 4. *Results of Structural Equation Modelling Analysis (completely standardized coefficients and t-values)*

Dependent Variables →	PERFORMANCE (AT THE NETWORK LEVEL)	COORDINATION MECHANISMS	MANAGERIAL ROLES
GOVERNANCE STRUCTURE	.08	-.05	.26
	(1.00)	(-.61)	(3.60)***
MANAGERIAL ROLES	.13	.30	
	(-1.37)	(3.32)**	
COORDINATION MECHANISMS	.29		
	(2.94)**		
Control Variables			
Size	.18		
	(2.13)*		
External Control	-.16		
	(1.01)		
Resource Munificence	.16		
	(-1.93)		
R^2	.17	.09	.07

*p<0.05; **p<0.01: ***p<0.001 (two tailed test). N=209

5. Discussion and Conclusions

The main purpose of this paper is to investigate the direct and joint effects of governance forms, coordination mechanisms and managerial roles on network performance.

The final structural model supports the following: first, tight forms of governance positively and significantly affect managerial roles. In line with Provan and Kenis' thesis (2007), each mode of governance requires the development of appropriate competencies and the fulfilment of specific tasks. Our study confirms the hypothesis (H5): tight modes of governance require a managerial role to manage network interdependencies and their side effects; NAOs need to be strengthened by a network manager who facilitates and sustains partner interactions, solves tensions among partners and leads the overall network towards achieving results. Second, a network manager significantly affects the incidence of formalized coordination mechanisms within the network (H6). Hence, managerial role capabilities also lie in the selection (Agranoff and McGuire, 2001; Steijn et al., 2011) and use of traditional hierarchical coordination tools that ease "the complexity of coordination across the many organizations that constitute the network" (Isett and Provan, 2005: 161). Third, the greater development of these traditional coordination mechanisms is positively related to better performance at the network level (H3); this implies that the classic hierarchical approach to coordination (Agranoff, 2006; Morris et al., 2007) holds in a network setting and is a key element fostering network success.

Contrary to our hypotheses (H1 & H2), a tight governance form has no significant effect on either performance at the network level or on coordination mechanisms. Thus, our study does not support that an NAO, as an ad hoc organization that administers and coordinates the network, can directly guarantee better performance (Huang and Provan, 2007; Isett and Provan, 2005; Milward and Provan, 2004). Nor does it demonstrate that an NAO calls for the extensive development of traditional coordination mechanisms to sustain its brokering function (Isett and Provan, 2005; Jennings and Ewalt, 1998).

Contrary to our hypothesis (H4), the presence of a network manager has no direct effect on network performance (Agranoff and McGuire, 2001; Edelenbos, Steijn and Klijn, 2010; Kickert et al., 1997; Kort and Klijn, 2011), suggesting that the simple

existence of a unique managerial role does not guarantee success but must be associated with appropriate coordination mechanisms.

Theoretical contribution. From a theoretical perspective, this paper considers the pool of studies (Cristofoli and Maccio', 2011; Cristofoli and Markovic, 2012; Edelenbos et al., 2010; Kort and Klijn, 2011; Raab and Milward, 2012) investigating the relationships between network performance and structural, functioning and managerial characteristics of networks. Within this research stream, our study attempts to overcome the weakness of small sample size (Raab and Milward, 2012). We found clear causal relationships that reinforce prior literature results and open new lines of research.

First, we shed light on how different network characteristics jointly affect network performance, showing simultaneously that only coordination mechanisms have a direct and positive effect on network performance while a tight governance form positively affects the presence of a unique managerial role, which in turn positively requires a higher level of coordination mechanisms. These results are significant since they demonstrate that scholars can no longer focus on a single performance predictor but must look at their joint effects: networks are a combination of structural characteristics and managerial roles and tools that together can improve performance. Thus, Jennings and Ewalt's line of reasoning (1998) on the joint and positive effect of coordination and consolidation on network results should be combined with a new attribute to positively affect network performance: the presence of a network manager and, in tight governance modes, to benefit from selecting appropriate coordination mechanisms. Moreover, this argument reinforces the discussion on the need for centralized managerial roles and traditional mechanisms to manage complex settings and problems (Provan and Kenis, 2007). Indeed, as noted in the Cristofoli and Maccio' (2011) study, these service delivery networks have a larger number of members, face difficult coordination processes and have high interdependent task requirements.

Second, we enrich the literature on the variation of different network forms (Raab and Kenis, 2009). The results partially support previous studies (Milward and Provan, 1998; Provan and Kenis, 2007) showing the importance of the NAO in network performance without demonstrating its direct impact: this network form cannot ensure good performance at the network level but has to be associated with proper managerial roles and arrangements. In fact, the study reveals that a dedicated organization as

disseminator of funds, network administrator and coordinator requires a network manager with facilitation, mediation and leadership capabilities.

Third, we sustain the thesis that network managers should rely on traditional hierarchal coordination mechanisms and confirm the importance of these tools for network success. This is coherent with previous studies that merge the traditional hierarchical and networking approach to coordination (Agranoff, 2006; Brown et al., 1998; Kettl, 2003; Morris et al., 2007): although non-hierarchical, networks require some level of bureaucratization in terms of formal procedures and tools for partner coordination. This result is also in line with Provan and Kenis' proposition (2007) on the NAO and lead organization's role in sustaining network stability: the joint and positive effect of tight forms of governance, network managers and formalized coordination mechanisms on the ability to endure and improve over time (performance at the network level) confirms that networks need "a formalized structure that can be sustained over time" (Provan and Kenis, 2007: 245).

Managerial Implication. From a managerial perspective, this paper provides possible guidelines for network success: a tight governance form, a network manager and traditional hierarchal coordination mechanisms. The more a network tightens its governance mode by defining a separate coordination and control unit, the more it requires a unique network manager and formal coordination mechanisms for partner interaction and decision-making processes. This is also important in terms of the structural design of the network itself: the selection and implementation of a governance form requires carefully defining the managerial roles and tools. Networks cannot be a pretext for the absence of procedures and rules that coordinate and manage interdependencies: long-lasting networks demand a certain level of bureaucratization.

Limitations and suggestions for further research. Our study is certainly not free of limitations and caution in generalizing the results and causal relationships is recommended. First, our research design was cross-sectional. Second, we used a sample from a single country. Third, the operationalization of the different concepts is largely based on literature due to the absence of recognized and tested scales.

Future research should therefore use a cross-national sample to test the strength of our concepts and consider other well-recognized predictors of network performance such as different structural characteristics (Huang and Provan, 2007; Provan and

Milward, 1995; Provan and Sebastian, 1998) and network context (Provan and Milward, 1995) and evaluate their joint and directs effects on network results. Divergent results may also be found when investigating the role of the different cultural regions of Switzerland.

Furthermore, the results show the importance of traditional coordination mechanisms and the need for a certain amount of formalization in network settings but do not sustain their predominance over so-called network-based mechanisms. Additional studies should consider the relations between these two types of tools in tight governance forms in order to understand the apparently contradictory need for stability and flexibility within networks.

Moreover, we investigated the relationship between network characteristics and performance at the network level (Provan and Milward, 2001), conceived in terms of structure and output-based measures (Cristofoli and Maccio', 2012), while another level of conceptualization and measurement of network performance could provide different results.

The evaluation of so-called managerial roles only refers to the presence of a network manager or other institutional bodies with specific capabilities and functions. We do not identify how these managerial roles perform and what strategies they apply. This issue needs further investigation and may justify the absence of a direct effect of network managers on network performance.

References

Agranoff, R. (2006). Inside collaborative networks: Ten lessons for public managers. *Public Administration Review, 66*, 56-65.

Agranoff, R. and McGuire, M. (1998). A jurisdiction-based model of intergovernmental management in U.S. cities. *Publius: The Journal of Federalism, 28*(4), 1-20.

Agranoff, R. and McGuire, M. (1999). Managing in networking settings. *Review of Policy Research, 16*(1), 18-41.

Agranoff, R. and McGuire, M. (2001). American federalism and the search for models of management. *Public Administration Review, 61*(6), 671-681.

Agranoff, R. and McGuire, M. (2003). Inside the matrix: Integrating the paradigms of intergovernmental and network management. *International Journal of Public Administration, 26*(12), 1401-1422.

Anderson, J. C. and Gerbing, D. W. (1998). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-23.

Brown, M. M., O'Toole, L. J., Jr. and Brudney, J. L. (1998). Implementing information technology in government: An empirical assessment of the role of local partnerships. *Journal of Public Administration Research and Theory: J-PART, 8*(4), 499-525.

Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications and programming* (Erlbaum ed.)

Conrad, D. A., Cave, S. H., Lucas, M., Harville, J., Shortell, S. M., Bazzoli, G. J., Margolin, F. (2003). Community care networks: Linking vision to outcomes for community health improvement. *Medical Care Research and Review, 60*(4 suppl), 95S-129S.

Cristofoli, D. and Maccio', L. (2011). Structure, mechanisms and managers in successful networks. *IRSPM 2011, Dublin.*

Cristofoli, D. and Maccio', L. (2012). To wind a skein into a ball: Exploring the concept and measures of public network performance. *IRSPM 2012, Rome.*

Cristofoli, D. and Markovic, J. (2012). How to make public networks really work. A qualitative comparative analysis. *IRSPM 2012, Rome.*

Cristofoli, D., Markovic, J. and Meneguzzo, M. (2012). Governance, management and performance in public networks: How to be successful in shared-governance networks. *Journal of Management and Governance.*

Edelenbos, J., Steijn, B. and Klijn, E. (2010). Does democratic anchorage matter?: An inquiry into the relation between democratic anchorage and outcome of Dutch environmental projects. *American Review of Public Administration, 40*(1), 46-63.

Fornell, C. and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Grandori, A. and Soda, G. (1995). Inter-firm networks: Antecedents, mechanisms and forms. *Organization Studies, 16*(2), 183-214.

Hageman, W., Zuckerman, B., Weiner, B., Alexander, J. and Bogue, R. (1998). Navigating the rapids of collaborating governance. *Health Care Forum Journal, 41*, 47-15.

Hooper, D., Coughlan, J. and Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53-59.

Hu, L. T. and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

Huang, K. and Provan, K. G. (2006). Resource tangibility and patterns of interaction in a publicly funded health and human services network. *Journal of Public Administration Research and Theory, 17*(3), 435-454.

Huang, K. and Provan, K. G. (2007). Structural embeddedness and organizational social outcomes in a centrally governed mental health services network. *Public Management Review, 9*(2), 169-189.

Isett, K. R., Mergel, I. A., LeRoux, K., Mischen, P. A. and Rethemeyer, R. K. (2011). Networks in public administration scholarship: Understanding where we are and where we need to go. *Journal of Public Administration Research and Theory, 21*(suppl 1), 157-173.

Isett, K. R. and Provan, K. G. (2005). The evolution of dyadic interorganizational relationships in a network of publicly funded nonprofit agencies. *Journal of Public Administration Research and Theory, 15*(1), 149-165.

Jarvis, C., MacKenzie, S. and Podsakoff, P. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research, 30*(2), pp. 199-218.

Jennings, E. T., Jr. and Ewalt, J. A. G. (1998). Interorganizational coordination, administrative consolidation, and policy performance. *Public Administration Review, 58*(5), 417-428.

Kenis, P. and Provan, K. (2009). Towards an exogenous theory of public network performance. *Public Administration, 87*(3), 440-456.

Kettl, D. F. (2003). Contingent coordination: Practical and theoretical puzzles for homeland security. *The American Review of Public Administration, 33*(3), 253-277.

Kickert, W. J. M., Klijn, E. H. and Koppenjan, J. F. M. (1997). *Managing complex networks*. London: SAGE.

Klijn, E. H. and Koppenjan, J. F. M. (2004). *Managing uncertainties in networks; A network approach to problem-solving and decision-making*. London: Routledge.

Klijn, E. H., Steijn, B. and Edelenbos, J. (2010). The impact of network management on outcomes in governance networks. *Public Administration, 88*(4), 1063-1082.

Klijn, E. (1996). Analyzing and managing policy processes in complex networks: A theoretical examination of the.. *Administration and Society, 28*(1), 90.

Kort, M. and Klijn, E. (2011). Public-private partnerships in urban regeneration projects: Organizational form or managerial capacity? *Public Administration Review, 71*(4), 618-626.

Lindencrona, F., Ekblad, S. and Axelsson, R. (2009). Modes of interaction and performance of human service networks. *Public Management Review, 11*(2), 191-215.

Long, J. S. (1983). *Confirmatory factor analysis: A preface to LISREL* SAGE.

Mandell, M. P. and Keast, R. (2008). Evaluating the effectiveness of interorganizational relations through networks. *Public Management Review, 10*(6), 715-731.

Mandell. M.P. (2001). *Getting results through collaboration: Networks and network structures for public policy and management.* (2001st ed.). Westport. Ct.: Quorum Books.

McGuire, M. (2002). Managing networks: Propositions on what managers do and why they do it. *Public Administration Review, 62*(5), 599-609.

McGuire, M. and Agranoff, R. (2011). The limitations of public management networks. *Public Administration, 89*(2), 265-284.

Meier, K. J. and O'Toole, L. J., Jr. (2001). Managerial strategies and behavior in networks: A model with evidence from U.S. public education. *Journal of Public Administration Research and Theory, 11*(3), 271-294.

Milward, H. B. and Provan, K. (2004). The public manager's guide to network management. *Eller College Working Paper, 1008-04* (Available at SSRN: http://ssrn.com/abstract=607421 or http://dx.doi.org/10.2139/ssrn.607421)

Milward, H. B. and Provan, K. G. (1998). Measuring network structure. *Public Administration, 76*(2), 387-407.

Mitchell, R. E., Florin, P. and Stevenson, J. F. (2002). Supporting community-based prevention and health promotion initiatives: Developing effective technical assistance systems. *Health Education & Behavior, 29*(5), 620-639.

Morris, J. C., Morris, E. D. and Jones, D. M. (2007). Reaching for the philosopher's stone: Contingent coordination and the military's response to hurricane Katrina. *Public Administration Review, 67*, 94-106.

Nolte, I. M. and Boeing, S. (2011). Supporting community-based prevention and health promotion initiatives: Developing effective technical assistance systems. *Public Administration, 89*(4), 1385-1402.

O'Toole, L. J., Jr. and Meier, K. J. (2004). Public management in intergovernmental networks: Matching structural networks and managerial networking. *Journal of Public Administration Research & Theory, 14*(4), 469-494.

O'Toole, L. J., Jr. (1997). Treating networks seriously: Practical and research-based agendas in public administration. *Public Administration Review, 57*(1), pp. 45-52.

Provan, K. G., Fish, A. and Sydow, J. (2007). Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management, 33*(3), 479-516.

Provan, K. G. and Kenis, P. (2007). Modes of network governance: Structure, management, and effectiveness. *Journal of Public Administration Research and Theory, 18*(2), 229-252. doi: 10.1093/jopart/mum015

Provan, K. G. and Milward, H. B. (1995). A preliminary theory of interorganizational network effectiveness: A comparative study of four community mental health systems. *Administrative Science Quarterly, 40*(1), pp. 1-33.

Provan, K. G. and Milward, H. B. (2001). Do networks really work? A framework for evaluating public-sector organizational networks. *Public Administration Review, 61*(4), 414-423.

Provan, K. G. and Sebastian, J. G. (1998). Networks within networks: Service link overlap, organizational cliques, and network effectiveness. *The Academy of Management Journal, 41*(4), 453-463.

Raab, J. and Milward, H. B. (2012). Building a configurational theory of network performance. *IRSPM 2012,*

Raab, J. and Kenis, P. (2009). Heading toward a society of networks: Empirical developments and theoretical challenges. *Journal of Management Inquiry, 18*(3), 198-210.

Satorra, A. and Bentler, P. M. (1988). Scaling corrections for chi-square statistics in covariance structure analysis. *Proceedings of the American Statistical Association,* 308-313.

Satorra, A. and Bentler, P. M. (1994). Corrections for test statistics and standard errors in covariance structure analysis. In A. Von Eye and C. Clogg (Eds.), *Latent variable analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage.

Satorra, A. and Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66,* 507-514.

Shortell, S. M., Zukoski, A. P., Alexander, J. A., Bazzoli, G. J., Conrad, D. A., Hasnain-Wynia, R., Margolin, F. S. (2002). Evaluating partnerships for community health improvement: Tracking the footprints. *Journal of Health Politics, Policy and Law, 27*(1), 49-92.

Steijn, B., Klijn, E. H. and Edelenbos, J. (2011). Public-private partnerships: Added value by organizational form or management? *Public Administration, 89*(4), 1235–1252.

Steiner, R. (2000). New public management in Swiss municipalities. *International Public Management Journal, 3*(2), 169-189.

Steiner, R. (2003). The causes, spread and effects of intermunicipal cooperation and municipal mergers in Switzerland. *Public Management Review, 5*(4), 551-571.

Susskind, L. and Cruikshank, J. (1987). *Breaking the impasse: Consensual approaches to resolving public*. New York: Basic Books.

Turrini, A., Cristofoli, D., Frosini, F. and Nasi, G. (2010). Networking literature about determinants of network effectiveness. *Public Administration, 88*(2), 528-550.

Ullman, J. B. (2006). Structural equation modeling: Reviewing the basics and moving forward. *Journal of Personality Assessment, 87*(1), 35-50.

Weiner, B. J., Alexander, J. A. and Zuckerman, H. S. (2000). Strategies for effective management participation in community health partnership. *Health Care Management Review, 25*(3), 48-18.

Williams, L. J., Buckley, R. M. and Cote, J. A. (1989). Lack of method variance in self-reported affect and perceptions at work: Reality or artifact? *Journal of Applied Psychology, 74*(3), 462.

APPENDIX A. *Items, sources and scale properties*

GOVERNANCE FORMS (new items based on Provan and Kenis, 2007) AVE=0.58; CR=0.77	*In your opinion, in the network of organizations (e.g., Cantonal Government, Municipalities, no-profit organizations, etc.), including your Spitex, providing homecare services…* *(1. ALTOGETHER; 4. HOMECARE (HC) LEADER; 7. ADMINISTRATIVE AGENCY)* 1. The coordination of the network of partner organizations is the responsibility of …	
		0.80 (n.a.)
	2. The administration of the network of partner organizations is the responsibility of …	.77 (12.36)
	3. The organization of the network of the partner organizations is the responsibility of …	.87 (15.30)
	4.Contacting and activating partner organizations is the responsibility of …	.67 (8.40)
	5. Stimulating the interaction within the network of partner organizations is the responsibility of …	.68 (9.33)
COORDINATION MECHANISMS (new items based on Cristofoli and Maccio', 2012) AVE= 0.54; CR=0.87	*How do you rate the following statements on a scale of 1 (totally disagree) to 7 (totally agree).* 1. Regular meetings are normally organized to coordinate the activities of partner organizations (they may be weekly, monthly or three or four times a year).	.83 (n.a.)
	2. My Spitex participates in regular meetings with partner organizations to coordinate homecare provision.	.81 (10.12)
	3. Coordination of each other's activities in the collaboration involving my Spitex and the partner organizations is based on standard operating procedures (rules, policies, forms).	.53 (6.70)
MANAGERIAL ROLES (new items based on Agranoff and McGuire, 1999; Agranoff and McGuire, 2001; Kickert et al., 1997) AVE= 0.57; CR=0.87	*Who NORMALLY performs the following activities, when they take place? (1. NOBODY; 4. INSTITUTIONAL BODIES; 7. SPITEX DIRECTOR)* 1. Solves conflicts among the partner organizations when they occur.	.78 (n.a.)
	2. Acts as a mediator and broker (of interests/points of view) between partner organizations.	.81 (16.64)
	3. Forges agreements among partner organizations on the role and support of network activities.	.71 (9.84)
	4. Forges agreements among partner organizations on the mission and vision of the network.	.78 (12.01)
	5. Leads all partner organizations towards a common objective.	.70 (9.91)
PERFOMANCE AT THE NETWORK LEVEL new items based on (Cristofoli and Maccio', 2012; Provan and Milward, 2001) AVE= 0.57; CR=0.84	*How do you rate the following statements on a scale of 1 (totally disagree) to 7 (totally agree).* 1. The number of partner organizations involved in the homecare provision has grown over time.	.60(n.a.)
	2. The relationship with partner organizations we collaborate with have become stronger.	.71 (5.92)
	3. The range of services we provide has increased due to collaboration with other organizations.	.84 (7.95)
	4. Services from different organizations are better coordinated and integrated because of the collaboration.	.86 (7.42)
SIZE	*Please, indicate the range of partner organizations usually collaborating with your Spitex to provide homecare services.* - 0-10 - 11-20 - 21-30 - 31-40 - 41-50 - 51-60 - more than 60	

EXTERNAL CONTROL	*Please indicate the organizations that normally control the activities of your Spitex (more than one answer is possible).* - Cantonal Department - Municipalities - Cantonal Doctor - Cassa Malati - Social Insurance - External Auditor - Other _____	
RESOURCE MUNIFICENCE	*Percentage of public funds*	

CONCLUSIONS

"Do public networks really work?" is the leitmotiv of this research: despite being pervasive and considered a good solution to managing interdependencies and provide public services, public networks need to be investigated alongside their performance and structural and managerial characteristics. Addressing these topics is crucial not only for scholars in the field but also for the community at large. Understanding how to measure network performance is highly relevant to researchers investigating public networks as well as to practitioners managing and coordinating them. Understanding the relations between structural and managerial network characteristics and how these can jointly affect network performance would not only enhance the acquisition of theoretical knowledge but would also provide practical guidelines for sustaining and improving network success. Furthermore, these investigations could promote the improvement of services offered to network clients who require networks to produce, to manage resources, organize their structures and evaluate their results according to needs. Finally, they can improve both external legitimacy towards the network activities of external stakeholders and internal legitimacy, with network members sharing a common vision and commitment.

This means resolving the following questions '*How can we evaluate public network performance?* and '*What are the determinants of network performance?*'

From a methodological perspective, to respond to these questions this dissertation applies a sequential exploratory strategy using a qualitative approach and, subsequently, implement a second and third quantitative data collection and analysis phase. First, it explores how public networks work from a qualitative perspective. Second, it investigates the meaning of network performance, reviewing the different conceptualizations and measures developed by current literature on public networks. Finally, from a quantitative perspective, it examines how different network characteristics can affect and influence network performance.

These conclusions are intended to sum up the research path undertaken in this thesis to answer the research questions and indicate the main findings; they also propose guidelines and suggestions for further studies. Finally, publications and works-in-progress are presented in a box at the end.

In the first stage of the research, the dissertation opts for an exploratory multiple case study to provide better understanding of the public networks in question, their main governance, structural and managerial characteristics, paving the way for the subsequent quantitative investigations. Indeed, the article "*Structure, mechanisms and managers in successful networks*" shows that, in successful networks and established contexts, different network structures may require different mechanisms and managerial abilities (or a different combination of these) with the latter aspects depending on the former. This enables to hypothesize that the network mechanisms, structure and manager(s) can jointly affect network performance. Moreover, this first article shows that networks rely on both formal and informal mechanisms to support member integration and coordination: reliance on formalized rules, procedures and personal relationships between network members are powerful means of integration and could affect network success. Third, the results outlined in the article appear to challenge the importance of a unique network manager for network success while suggesting that the different skills and abilities that a network manager is expected to develop to successfully manage public networks can be also shared among numerous official actors and institutional bodies.

Following this research step, the dissertation considers the concepts and measurements of network performance and moves towards a quantitative but still exploratory approach. The results from the article "*To wind a skein into a ball: exploring the concept and measures of public network performance*" suggest some relevant considerations. Concepts and measures of network performance are numerous, at times fuzzy and overlapping: network performance is approached from different levels of analysis (community, network and organization) and with three key measurement approaches (structure-related, process-related and output-related). The results support the use of a multidimensional model to ascertain network performance. Comprehensive understanding of the term and its measures requires combining innovative measures related to network processes with more traditional measures related to network structure and outputs. Hence, the article demonstrates that traditional performance attributes, in terms of the network's ability to survive in the long term and achieve its goals, should be combined with more innovative measures mirroring the level of interdependence, collaboration and integration within the network. Secondly, it

is noted that, notwithstanding the coexistence of multiple measures and approaches, those participating and working in networks pay more attention to traditional measures of network performance, namely, those formerly called structure-related and output-related constructs. Finally, the article develops a multidimensional conceptualization and measure of performance at the network level of analysis based on two main attributes: the ability of the network to survive in the long term and to achieve its outputs. Network survival rests on internal (from network workers) and external (from politicians, citizens and mass media) legitimacy that allows clients to access stable and continuous services, provides worker recognition and support, with network partners progressively deriving advantages from the collaboration. The network's ability to achieve its own objectives refers to the outputs of public networks in terms of efficiency, effectiveness and equity. These results respond to one of the research questions and fill an important gap in literature on public networks since they lead to a conceptualization of network performance based on a multidimensional model that largely supports traditional definitions and measures. Moreover, presenting the viewpoint of those participating and working in the network, this model integrates and is consistent with those approaches that consider the ability of a network to survive and achieve its objectives as the most important indicator of good performance for clients (as Provan and Milward argued in 1995 and 2001) and network partners (as Provan et al. stated in 2005).

The last paper "*Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles*" addresses the question on performance determinants and how these relate to each other, collecting and using all the main findings and suggestions from the previous two phases. Considering the impact of different determinants on network performance, the first step of this research project has decidedly established their importance and mutual influence. Similarly, the multidimensional model developed in the second article provides a conceptualization of network performance and sound measures. Consequently, this last part takes a quantitative and explanatory approach to evaluate the joint impact of structural, governance, managerial and functioning characteristics on network performance in line with more traditional concepts and measures. The results are important because they confirm that service delivery networks are a combination of structural characteristics

and managerial roles and tools that together can improve their performance. Hence, scholars can no longer focus on single performance predictors but need to look at their joint effects: network governance forms cannot ensure good performance on their own but need to be associated with proper managerial roles and arrangements. Indeed, the study demonstrates that public networks can ensure their success through a combination of proper structural, managerial and functioning characteristics. This combination includes three key components: a dedicated organization disbursing funds, administrating and coordinating the network, a network manager with facilitating, mediating and leadership capabilities, and formalized instruments and tools to sustain partner interactions. Mandatory and publicly funded service delivery networks have to manage complex settings and problems, large numbers of members, difficult coordination processes and have highly interdependent task requirements. Through highly structured network forms, consolidated managerial roles and traditional hierarchal coordination mechanisms they can improve their ability to survive in the long term and achieve their goals.

From a theoretical perspective, the overall research project offers some important contributions.

- In line with recent studies (Provan and Milward, 2001; Keast *et al.,* 2004; Kenis and Provan, 2009; Lindencrona *et al.,* 2009), public network performance requires a multidimensional approach combining different traditional conceptualizations and measures to assess the network's ability to survive in the long term (Provan and Milward, 2001; Kenis and Provan, 2007, 2009) and to reflect the network's ability to achieve its own objectives (Provan and Milward, 2001; Kenis and Provan, 2007, 2009) in terms of efficiency, effectiveness and equity. However, more innovative concepts and measures in relation to the development of collaborative processes within the network would seem to be a "prerequisite" for network survival and the achievement of expected outputs.

- This research integrates literature investigating how to successfully manage public networks and the structural and managerial determinants that affect network results (McGuire and Agranoff, 2011; Turrini, Cristofoli, Frosini and Nasi, 2010). Specifically, it deals with studies (Cristofoli, Maccio' and Pedrazzi, 2013; Cristofoli and Markovic, 2012; Edelenbos et al., 2010; Kort and Klijn,

2011; Raab and Milward, 2012) analysing the relationships between network performance and structural, functioning and managerial network characteristics and, within this stream of research, represents a first attempt to overcome the weakness of small sample-size of prior studies. As suggested by Turrini et al. (2010), this study indicates that network success relies on different combinations of network performance predictors. Different network structures may in fact require different mechanisms and managerial roles and abilities (or a different combination of these) to be successful. Among these combinations, we have demonstrated clear causal relationships that strengthen previous literature results: to positively improve network performance, tight governance modes should be combined with the presence of a network manager making use of appropriate formal coordination mechanisms.

- The more in-depth analysis of the importance of each performance determinant enhances literature investigating structural and governance characteristics (Raab and Kenis, 2009). Partially supporting prior studies (Milward and Provan, 1998; Provan and Kenis, 2007), this dissertation emphasizes the importance of a NAO as network fund disseminator, administrator and coordinator: tight network forms alone cannot ensure good performance but need to be combined with appropriate managerial roles and arrangements. Similarly, the joint and positive effect of tight forms of governance, the presence of a network manager and formalized coordination mechanisms on the ability to endure and improve over time confirms the need for "a formalized structure that can be sustained over time" (Provan and Kenis, 2007: 245).

- Public networks have always been labelled as an organizational form that is able to overcome bureaucratic rigidity. However, this study suggests that in uncertain and complex situations, public networks need to be managed bureaucratically: formalized mechanisms and tools used to sustain partner interactions are useful in complex networks to coordinate partner interdependences and harmonize different interests. In line with existing literature, functioning mechanisms should refer to both the traditional hierarchical and the networking approach to coordination (Agranoff, 2006; Brown et al., 1998; Kettl, 2003; Morris et al., 2007). Hence, definitive connections, distinct positions and authority functions,

hierarchical mechanisms, task specialization, routines and rules should coexist with more flexible and adaptable tools, negotiation and mutual adjustment mechanisms. Although non-hierarchical, public networks also have some aspects typifying the culture and traditional behaviours of public sector organizations. As bureaucracies, they manage uncertainty and complexity by defining rules and procedures, while formalization is considered a good way to sustain network stability.

- The research supports literature (Agranoff and McGuire, 2001; Edelenbos et al., 2010; Kickert et al., 1997; Kort and Klijn, 2011) investigating the importance of managerial roles and capabilities in public networks. Extant literature has typically stressed the need for a network mediator, facilitator and/or leader in order to ensure that the network is successful (Kickert et al. 1997; Agranoff and McGuire 1998; Mitchell et al. 2002). However, coherently with literature emphasizing that it is more managerial capabilities and skills than the person per se that matter, this dissertation maintains that the simple presence of a network manager does not guarantee successful performance but should be associated with proper coordination mechanisms and governance forms. Moreover, it suggests that attention should be paid to how these managerial roles perform and which strategies they apply. Indeed, these managerial activities could be performed not only by the unique network manager but also by a group of institutional and official bodies sharing skills, tasks and responsibilities. Again in this case, public networks appear to be midway between the bureaucratic and the network approach: at times, they seem to be ruled by numerous official actors typical of the bureaucratic culture, at others, they appear to take a managerial and entrepreneurial approach.

In empirical terms, this study offers important insights for public managers on how to successfully manage public networks and shows that selecting network mechanisms and managerial roles and capabilities that sustain the network governance form is beneficial. On one hand, a unique network manager and formal coordination mechanisms for partner interactions and decision-making processes are essential when a tight form of governance is established. On the other hand, the definition and establishment of the governance form calls for a careful selection of proper managerial

roles and tools. Finally, networks that are able to survive in the long-term and achieve their goals cannot avoid a certain level of bureaucratization of tools and mechanisms that coordinate and manage interdependencies.

In conclusion, this research opens new paths for future studies on public network performance and its determinants. It opens the way to other quantitative studies investigating the joint and direct effect of determinants on network performance and provide generalizable results. Additional studies should analyse the relations between traditional and network-based coordination mechanisms to understand the seemingly contradictory need for formalization and flexibility within networks. Thus, more studies on the possible bureaucratization of public networks should be undertaken. The relations between governance forms and the specific abilities and functions of managerial roles should be analysed and addressed. Furthermore, the peculiarities of networks analysed could offer relevant elements for comparison. On one hand, this research focuses on service-delivery networks and it would be interesting to investigate whether the results can be replicated in policy-networks. On the other hand, the networks studied her are assumed to endure in the long-term while future studies could take into account the different stages of network development.

References

Agranoff, R. (2006). Inside collaborative networks: Ten lessons for public managers. *Public Administration Review, 66*, 56-65.

Brown, M. M., O'Toole, L. J.,Jr., and Brudney, J. L. (1998). Implementing information technology in government: An empirical assessment of the role of local partnerships. *Journal of Public Administration Research and Theory: J-PART, 8*(4), 499-525.

Cristofoli, D., Maccio', L., and Pedrazzi, L. (2013). Structure, mechanisms and managers in successful networks. *Public Management Review,*

Cristofoli, D., and Markovic, J. (2012). How to make public networks really work. A qualitative comparative analysis. *IRSPM 2012, Rome.*

Edelenbos, J., Steijn, B., and Klijn, E. (2010). Does democratic anchorage matter?: An inquiry into the relation between democratic anchorage and outcome of dutch environmental projects. *American Review of Public Administration, 40*(1), 46-63.

Keast, R., Mandell, M. P., Brown, K., and Woolcock, G. (2004). Network structures: Working differently and changing expectations. *Public Administration Review, 64*(3), pp. 363-371.

Kenis, P., and Provan, K. (2009). Towards an exogenous theory of public network performance. *Public Administration, 87*(3), 440-456.

Kettl, D. F. (2003). Contingent coordination: Practical and theoretical puzzles for homeland security. *The American Review of Public Administration, 33*(3), 253-277.

Kickert, W. J. M., Klijn, E. H., and Koppenjan, J. F. M. (1997). *Managing complex networks*. London: SAGE.

Kort, M., and Klijn, E. (2011). Public-private partnerships in urban regeneration projects: Organizational form or managerial capacity? *Public Administration Review, 71*(4), 618-626.

Lindencrona, F., Ekblad, S., and Axelsson, R. (2009). Modes of interaction and performance of human service networks. *Public Management Review, 11*(2), 191-215.

Milward, H. B., and Provan, K. G. (1998). Principles for controlling agents: The political economy of network structure. *Journal of Public Administration Research and Theory: J-PART, 8*(2), 203-221.

Mitchell, R. E., Florin, P., and Stevenson, J. F. (2002). Supporting community-based prevention and health promotion initiatives: Developing effective technical assistance systems. *Health Education & Behavior, 29*(5), 620-639.

Morris, J. C., Morris, E. D., and Jones, D. M. (2007). Reaching for the philosopher's stone: Contingent coordination and the military's response to hurricane katrina. *Public Administration Review, 67*, 94-106.

Provan, K. G., and Kenis, P. (2007). Modes of network governance: Structure, management, and effectiveness. *Journal of Public Administration Research and Theory, 18*(2), 229-252.

Provan, K. G., and Milward, H. B. (2001). Do networks really work? A framework for evaluating public-sector organizational networks. *Public Administration Review, 61*(4), 414-423.

Raab, J., and Milward, H. B. (2012). Building a configurational theory of network performance. *Irspm 2012,*

Turrini, A., Cristofoli, D., Frosini, F., and Nasi, G. (2010). Networking literature about determinants of network effectiveness. *Public Administration, 88*(2), 528-550.

This thesis led to the following publications, works in progress, chapters in books and conference papers:

Publications
Cristofoli, D. Macciò, L. and Pedrazzi, L. (2013). Structure, mechanisms and managers in successful networks, Public Management Review. DOI:10.1080/14719037.2013.798025
Calciolari, S. Cristofoli, D. and Macciò, L. (2012). Explaining the Reactions of Swiss Municipalities to the 'Amalgamation Wave', Public Management Review, DOI: 10.1080/14719037.2012.698852.
Cristofoli, D. and Macciò, L. (2011). Managing successful networks: the case of intermunicipality collaboration in Switzerland. 2011 Yearbook Swiss Public Administration Society.
Cristofoli, D. and Macciò, L. (2013). The success of service delivery-networks: you can maximize your managerial efforts, but Governments set your frontiers, 2013 Yearbook Swiss Public Administration Society. (forthcoming)

Working papers in refereed journals (submitted and under revision)
"To wind a skein into a ball: exploring the concept and measures of public network performance" (Co-author D. Cristofoli), International Public Management Journal. Revised and resubmission.
 "Managing strategically in collaborative networks" (Co-author D. Cristofoli, Markovic, J. and Meneguzzo, M.), in Bryson, J. Holzer, M. and P. Joyce, Developments in Strategic and Public Management, Palgrave Macmillan.

Chapters in books
Cristofoli, D. Macciò, L. and Pedrazzi, L. (2012). "Governance, management e performance dei network pubblici" (Governance, management and performance in public networks), in M. Meneguzzo, D. Cristofoli, D. Ferrari and T. Gianella, Management Pubblico in Ticino. Teorie, esperienze e prospettive, Bellinzona: Salvioni Edizioni. ISBN: 978-88-7967-256-6
Cristofoli, D. and Macciò, L. (2012). "Aggregazioni comunali tra ricerca dell'efficienza e protezione dell'identità locale" (Municipal aggregations between efficiency and local identity), in M. Meneguzzo, D. Cristofoli, D. Ferrari and T. Gianella (2012), Management Pubblico in Ticino. Teorie, esperienze e prospettive, Bellinzona: Salvioni Edizioni. ISBN: 978-88-7967-256-6
Cristofoli, D. Macciò, L. and Markovic J. (2012). "Governance e management delle reti di assistenza e cura a domicilio" (Governance and management of social health care assistance), in S. Calciolari and M. Meneguzzo, Management Sanitario: principi, esperienze locali e internazionali, prospettive. Bellinzona: Salvioni Edizioni. ISBN: 978-88-7967-212-2

Conference papers
Cristofoli, D. and Macciò, L. (2013) Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles. EGPA 2013, 11-13 September, Edinburgh.
Cristofoli, D. and Macciò, L. (2013) Determinants of public network performance: linking governance forms, coordination mechanisms and managerial roles. IRSPM 2013, 9-11 April, Prague.
Cristofoli, D. Macciò, L. Markovic J. and Meneguzzo, M. (2012). Structure, strategies, mechanisms and performance in public networks. EGPA 2012 Annual Conference, 6-9 September, Bergen.
Cristofoli, D. and Macciò, L. (2012). To Wind a Skein into a Ball: How to Govern and Manage Successful Networks. 8th Transatlantic Dialogue Transitions in Governance, 7-9 June, Nijmegen, The Netherlands.
Cristofoli, D. and Macciò, L. (2012). Exploring measures of public network performance. IRSPM 2012. April 11-13, - Rome.
Cristofoli, D. Macciò, L. and Pedrazzi, L. (2011). Managing successful networks: a "managerial style" for each season? The case of intermunicipality collaboration in Switzerland. IRSPM 2011, 11-13 April, Dublin.
Cristofoli, D. Macciò, L. and Pedrazzi, L. (2011). "Networks funded by the public sector can and should be evaluated" – Ok, but how?" Public Management Research Association Conference, 2-4 June, Syracuse (USA).
Calciolari S., Cristofoli D., Macciò L. (2011). More politics or more management? Exploring the predictors of successful public management reforms. Public Management Research Association Conference, 2-4 June, Syracuse (USA).
Cristofoli, D. Macciò, L. and Pedrazzi, L. (2011). Politicians, managers and professionals. Exploring the predictors and consequences of the Government role in Swiss public networks. TAD, June, Newark (USA).

METHODOLOGICAL APPENDIX

1. Case study research method

The literature offers many and sometimes contrasting approaches dealing with case study research. This thesis takes a positivist position toward case study research method (Pratt, 2008; Gibbert and Ruigrok, 2010), mainly referring to Yin's approach.

Following Yin (2009: 18) "A case study is an empirical inquiry that investigates a contemporary phenomenon (e.g. a case) sets within its real-life context - especially when the boundaries between phenomenon and context are not clearly evident". It implies the researcher's willingness to understand in deep and within their context a case or few cases, "resulting in new learning about real-world behaviour and its meaning" (Yin, 1981: 4). Case study research answers to the so-called "how" and "why" questions that "deal with operational links needing to be traced over time, rather than mere frequencies or incidence" (Yin, 2009: 6). Moreover, it involves the examination of many conditions and events that are interconnected, difficult to control by the researcher, related to and embedded within the case(s). On one hand, the context and the need to explore the phenomenon in depth clearly differentiate cases study research from experiments where variables of interests are controlled and manipulated. Case study, in fact, faces the impossibility to influence behaviours and variables of interest, mainly because it deals with contemporary events and phenomena out of an isolated laboratory setting. In case study approach, context matters, reality is conceived through nuanced lenses rather than by the search of one best way and concrete, practical (context-dependent) knowledge is produced (Flyberrg, 2006). On the other hand, these attributes clearly set the boundaries to the usefulness and appropriateness of case study research that is suitable for studying complex events with multiple aspects and defining settings. In fact, "the distinctive need for case studies arise out of the desire to understand complex social phenomena" (Yin, 2009: 14). Hence complexity and dynamism are two key elements of this research method and could be traced also in Eisenhardt's definition of case study as "a research strategy which focuses on understanding the dynamics present within single settings." (1989: 534). The environment is an important part of this complexity and interacts with the phenomenon itself (Yin and Davis, 2007).

However, because the demarcation of the phenomenon and its setting can be blurred in real-life, a definition of the case study as a research method with technical and methodological peculiarities is necessary. From this perspective, the case study is a proper research strategy (Yin, 1981) that encompasses all the research process (from the research design through the data collection and analysis to the conclusion). It deals with the need to better understand a complex reality and, as a consequence, it tackles with many variables of interest, it relies on multiple sources of evidence and it "benefits from the prior development of theoretical propositions to guide data collection and data analysis" (Yin, 2009: 15). Moreover, even if case study research has mainly a qualitative nature, it is erroneous to identify it with qualitative analysis since different methods can be used (quantitative qualitative and mixed).

Given these attributes, what is case study well-suited for? Yin (2009) identifies three main types of case study research: exploratory, explanatory, and descriptive case studies. *Exploratory case studies* aim at defining research questions and hypotheses. This type is in line with those positions sustaining that "the case study is most useful for generating hypotheses; that is, in the first stage of a total research process, whereas other methods are more suitable for hypothesis testing and theory building" (Flyberrg, 2006: 4). *Explanatory case studies* seek for causal relation between an event and its effects and "consists of: (a) an accurate rendition of the facts of the case, (b) some consideration of alternative explanations of these facts, and (c) a conclusion based on the single explanation that appears most congruent with the facts." (Yin, 1981: 61). Both exploratory and explanatory case study are define as instrumental (Denzin and Lincon, 2005: 445) since they aim to a better understanding of an issue or to outline some generalization. *Descriptive case studies* are used to describe phenomena and their environment; some authors talk about intrinsic case study when "the study is undertaken because, first and last, one wants better understanding of this particular case" (Denzin and Lincon, 2005: 445) .

All these properties set case study research method in a unique place in research: it can be suited for describing and explaining; it can lead to infer causal relation among complex phenomenon or events; it can clarify different sets of outcome. Hence, it can provide for the lack of a theoretical framework, the lack of empirical evidence and the analysis of a phenomenon in its context.

The following parts deal with the main steps of the case study research process, namely: research design, data collection, analysis and reporting. A final paragraph discusses the critical argument of generalization through case study research and investigates the role of case studies for scientific development.

Research Design. Any empirical research needs an explicit research design that is a clear and logical strategy connecting empirical data to research questions, propositions and unit of analysis. It encompasses the logic linking the researcher's goals and questions, the case selection, the data and the proposition in order to provide clear criteria for interpreting findings and reaching conclusions. It can be intended both as a logical map that details relations among investigated elements and as an action plan that sets the trajectory from research questions to conclusions. Both these interpretations include a key attribute of the research design, that is coherence. Ensuring the coherence between research questions and evidence, the research design involves crucial decisions on the design types (explanatory, exploratory or descriptive; single or multiple case studies), the selection of the cases and the level of generalization of the study. Eisenhardt (1989) talks about "getting started" meaning that the rational underneath this phase is the same of hypothesis testing: the specification of the research focus and the a-priori definition of constructs and their measurements. Hence, research design needs also to specifically address which data will be collected (through clear definitions of the research questions, the propositions and the unit of analysis), and how these data will be managed (through the evaluation of the logic linking the data to the propositions and the criteria for interpreting the findings). The main components of research design are: research questions, propositions, unit of analysis, the logic linking the data to the propositions, the criteria for interpreting the findings, case study design, case selection, evaluation and criteria.

First of all, the definition of the *research questions* is a challenging step because it includes both defining the argument, the scope and the boundaries of the case study, and expressing the well-known "how" and "why" questions that can rely on former literature and studies. *Propositions* direct the attention on what to examine in the study: in explanatory studies, they can be conceived as possible (partial) answers that mirror important theoretical issues and hint at relevant evidence; in exploratory studies, propositions appear as purpose and "the criteria by which an exploration will be judged

successful" (Yin, 2009: 22). This definition clearly reflect Popper's point of view on the fact that it's hardly possible to approach the field without any predetermined notion of what one expects to find. The definition of the *unit of analysis* relates to the definition of the "case" of the study (the individual, the event of other entity such as programs, process, and changes) and is necessarily associated to the form of the research questions. As stated by Yin (2009: 7) "a case is generally a bounded entity (a person, organization, behavioural condition, event, or other social phenomenon), but the boundary between the case and its contextual conditions—in both spatial and temporal dimensions—may be blurred". Hence a clear unit of analysis reflects precise research questions that set the topic of the research, clarify concrete (such as spatial and temporal) boundaries of the real-life case and, as a consequence, avoid abstraction. During the design phase, the *logic linking the data to the propositions* involves the researcher's awareness of the coherence between the different analytical techniques (as explained below) with the specific case study. At the same way, the researcher needs to carefully identify the *criteria for interpreting the findings*, "engaging in a systematic search for alternative themes, divergent patterns, and rival explanations" Patton, 2001: 553).

All these elements are at the basis of the so called *case study design*. Yin (2009) proposed a useful matrix that encompasses the four main types of case study designs on the basis of the following variables: first, case study can consist of a single or multiple case studies; second, a case can be holistic (with a unique unit of analysis) or have embedded sub-cases (the same case study involves more units of analysis). According to Scholz and Olaf Tietje (2002: 9) "A holistic case study is shaped by a thoroughly qualitative approach that relies on narrative, phenomenological descriptions… Embedded case studies involve more than one unit, or object, of analysis and usually are not limited to qualitative analysis alone. The multiplicity of evidence is investigated at least partly in subunits, which focus on different and salient aspects of the case.". It is important to observe that any exploratory, explanatory or descriptive case studies can be either single or multiple, holistic or embedded and investigated in a longitudinal setting or in a comparative.

The choice for a single case study is mainly motivated by explorative reasons and has an intrinsic vulnerability that requires careful considerations of possible

misinterpretations and available evidences. In general, single case study falls into the following typologies:

- a critical case for testing well- defined theoretical hypothesis;
- an extreme or unique case that doesn't fit any well-known theoretical pattern;
- a typical case to explore;
- a revelatory case that has just became accessible to social science;
- a longitudinal case to study in different points in time.

Holistic case study design involves the analysis of a single case study and one unit of analysis while embedded design focuses also on other sub-units to increase the focus of the inquiry.

Multiple case study design addresses especially explanation and /or theory development reasons, being considered as more robust and compelling. In general, multiple case design is considered better than the single one (Eisenhardt, 1989) since it is less vulnerable and with many analytical benefits. Indeed, it comprehends a variety of parameters and data and, even if more difficult to implement, it can "provide greater confidence" (Yin, 2009). The selection of the multiple cases should be based on the replication (or comparative) logics that reflects the need to study complementary or contrasting facets of the same research topic. In particular, the replication logic entails cases selection based on: similar results (literal replication) or contrasting results (theoretical replication) but for flawless stated theoretical reasons. It is interesting to notice the inner difference between replication and traditional sampling logic. If the last aims at reflecting the reference population through proper statistical procedures, the replication approach starts from theoretical reasoning and aims at theory development, dealing with an iterative process of discovering and redesign. In the same way, the definition of the number of cases cannot follow statistical rules for sample size but has to carefully consider the number of replication coherently with the need for rival explanations from the theoretical framework. "The cases may be chosen to replicate previous cases or extended emergent theories, or they may be chosen to fill theoretical categories and provide examples of polar types" (Eisenhardt, 1989: 537). Researchers need to follow a theoretical sampling logic that, from a broad-spectrum perspective, helps to set research boundaries and findings. Finally, according to the event or phenomenon at stake, also multiple case studies can be embedded or holistic.

Yin's definition of case study design and the replication logic do not provide methodological parameters for multiple *case selection*. According to Patton's (2001), this selection can be based on the following sampling strategies:

- Extreme case - The selected case is an unusual event, such as an exceptional success or an extraordinary failure.

- Intensity case – Event if not extreme, this case information rich.

- Maximum variation – Cases with high variations that show relevant common patterns.

- Homogeneous - Cases with low variations (a small homogeneous group of subjects or units) are selected for examination and analysis

- Typical case - Case that can be considered as the typical, normal or average case.

- Stratified purposeful case – Particular units or cases that vary according to a key dimension are selected mostly for comparison.

- Critical case – Cases that "yield the most information and have the greatest impact on the development of knowledge" (Patton, 2001: 236) because they permit logical generalization to other cases.

- Snowball - Selection takes advantage of well-informed people that identify critical cases; tracking this chain of contacts, the researchers can identify critical cases that are mentioned multiple times.

- Criterion - Cases that satisfy some "predetermined criterion of importance" (Patton, 2001: 238).

- Theoretical - The cases are "incidents, slices of life, time periods, or people on the basis of their potential manifestation or representation of important theoretical constructs" (Patton, 2001: 238).

- Confirming and disconfirming - This selection technique occurs after an initial completed analysis and cases serve either as additional examples that fit the pattern or as examples that do not fit emergent patterns and lead to possible rival explanations.

- Opportunistic - Case selection emerges during the process of collecting data making use of the more knowledge of the phenomenon.

- Random purposeful - Cases are randomly selected from a large sample to increase credibility (but not to promote representativeness or generalization).

- Politically important case - Politically sensitive cases are selected or rejected.

- Convenience – Limits on time and resources drive the case selection and impact negatively on the research credibility.

- Combination - Case election is a combination of the aforementioned purposeful sampling strategies.

From the positive tradition, the *evaluation* of the research design is based on *four logical criteria* of validity and reliability that are typical of any social science methods and that involve the overall phases of case study research: construct validity, internal validity, external validity and reliability. In the following part, the definitions, the tactics and the involved research phases will be addresses for each criterion.

Construct validity identifies the "correct operational measures for the concepts being studied" (Yin, 2009: 41) and implies a clear definition of the research concepts of study and of the measures or the subjective judgements (Gibbert et al, 2008) for these concepts. Hence, it refers to the capability of truthfully detect and report the observed realities. In order to improve construct validity, researches could implement the following tactics: during the data collection phase, the use of multiple sources of evidence and the clear definition of a chain of evidence support the convergence of both concepts definitions and measures; when a first draft of the case study is available, a critical review done by key informants can prove and sustain the validity of the employed concepts and selected measures. *Internal validity* can be only applied to explanatory or causal studies (not for descriptive or exploratory studies) and refers "the causal relationship between variables and results" (Gibbert et al, 2008: 29). It deals with the general theme of making inference in case study and with the reliability of logics leading to research conclusions. Specific tactics could support the fulfilment of this criterion: during the research design phase, a clear research framework needs to be established; during the data analysis phase, predicted and empirical patterns have to be carefully compared; triangulation is required during data collection. *External validity* defines "the domain to which a study's findings can be generalized" (Yin, 2009: 43) and is logically linked to the concept of analytical generalization. Assuming this perspective and during the research design phase, the external validity of the single case study can be supported by the use of the theory providing a clear rationale for its selection and context; whereas in multiple-case studies, the replication logic can be via toward an

improvement of the study external validity (Gibbert et al, 2008). *Reliability* implies the demonstration "that the operations of a study – such as data collection procedures – can be repeated with the same results" (Yin, 2009: 45), it ensures that the reproduction of the same case study and the same procedures lead to the same results. Here, "the key words are transparency and replication" (Gibbert et al, 2008: 1468). In order to support this condition, research procedures should be clearly stated through the use of a case study protocol and the development of a case study database during the data collection phase. Moreover, triangulation of sources and of researchers should be ensured (Denzin 1978, Denzin and Lincoln 1994).

Even if all equally important, there is a clear "hierarchical relationship of validity types, with construct and internal validity acting as a condition sine qua non for external validity" (Gibbert et al., 2008: 1468): clear and logical theoretical statements have to be settled (internal validity), then they require a careful definitions of their empirical measures (construct validity) and, finally, analytical generalization can be drawn (external validity).

Data collection. The data collection is a key phase for supporting and corroborating the four criteria presented above and has to follow three main principles: the use of multiple sources of evidence; the creation of a case study database; the fulfilment of a chain of evidence. Dealing with complexity and with multiple attributes embedded in a context, case study requires *multiple sources of evidence*. Yin provides a list of main common and used sources: direct observation, interviews, archival records, documents, participant observation and physical artefacts. In line with the current case study research, the following box presents an in-depth analysis of interviews.

The necessity of dealing with multiple sources of evidence pertains to the need of *consistency* of the case study data and findings, the development of convergent lines of analysis and the corroboration of data and results. Indeed, the so called *triangulation of evidence* refers to the necessary and constant check and rechecks of findings' robustness in order to ensure "converging lines of inquiry" (Yin 2009: 100) and to sustain a "stronger substantiation of constructs and hypothesis" (Eisenhardt, 1989: 537): "The most desired convergence occurs when three (or more) independent sources all point to the same set of events, facts, or interpretations" (Yin 2009: 13). This procedure aims at clarifying meanings through the use of multiple perceptions in order to support the

repeatability of an interpretation but also to include and take account of the multiple and different perceptions and realities. Triangulation can be done at four different levels (Patton, 2002; Denzin 1984): data triangulation (same data in different context), investigator triangulation (same phenomenon analysed by different researchers), theory triangulation (same results interpreted by different theories) and methodological triangulation (the use of more methodological approaches). This procedure has to be supported by the creation of a case study database that clearly and logically stores notes, documents, tabular materials and narratives collected through these different sources. Indeed, case study evidences require to be presented with precision and transparency to allow the understanding of both the raw data and their consequent interpretation. Finally, all this process has the duty to maintain the so-called *chain of evidence* that is the possibility to clearly trace the research process and connections from conclusions to research questions (passing through the case study database, the sources and the case study protocol) and back (Yin 2009). Such a data collection phase sustains both construct validity and reliability: it means that the same phenomenon has been evaluated by different measures and it reports all the steps for research reproduction.

Case study data analysis. "Data analysis consists of examining, categorizing, tabulating, testing or otherwise recombining evidence to draw empirically based conclusions" (Yin, 2009: 109). According to Eisenahrdt (1989), this is the most difficult part of case study method because the least codified. Unlike other research methods, indeed, case study data are not supported by an automated algorithm that drives the researcher to the final output data but - even with the support of computer software - the researcher has the duty to define its specific algorithm according to the particular case (including also the use of statistical models when proper data are available). According to Yin (2009) this analytical algorithm involves the selection of general strategies and specific techniques that reduce difficulties and improve quality of case study analysis.

Qualitative Interviews

Interviews are an important source of evidence for case study and qualitative research in general since they aim to understand the phenomenon at stake in depth, according to the meanings that people bring to it and within its context (Denzin and Lincoln 2004). They involve different forms and uses. Forms vary from individual and group face to face interviews to telephone surveys and can have different structures. Uses involve many scientific and professional areas and focus on measuring or understanding individual and group standpoints. Duration can also differ: from a few minutes phone interviews to the so-called life history interviews and with all the possible variations in time between these two extremes.

Considering individual interviews, literature identifies three structural typologies: structured, semi-structured and unstructured interviews. Their aims are totally different: if structured interview "aims at capturing precise data of a codable nature so as to explain behaviour within pre-established categories", unstructured interview "attempts to understand the complex behaviour of members of society without imposing any a priori categorization that may limit the field of inquiry" (Denzin and Lincoln, 2004: 129). Semi structured, instead, are based on guideline topics explored through main questions that are used in every interview but without a pre-established order and level of investigation; they are well suited when the researcher has already some understanding of the case at stake. Structured interviews require asking "all respondents the same series of pre-established questions with a limited set of response categories" (Denzin and Lincoln, 2004: 124). Variation is limited, coding scheme predefined and the interviewer acts neutrally, never intervening with his personal point of view. Given these strict requirements to deviation from the original scheme and to the impersonal role of the interviewer, we can identify three source of errors of structure interviews: respondent behaviour could be consciously or not altered to give socially desirable answers or to neglect some information; the method and the ordering of the question could lead to misunderstandings; the techniques and the attitude of the interview could bring misinterpretations and communication problems. Unstructured interviews usually take the form of open-ended, in-depth and long interviews. According to McCracken (1988), even if unstructured, the long interview requires to follow these four steps in order to maximise the value of the time spent with the respondent. First, an exhaustive review of the literature has to be undertaken for a better definition of the issue and a coherent construction of the questions. Second, a cultural review of researcher's experience secures his critical distance in the data collection and analysis. Third, the development of the final questionnaire with a set of biographical questions takes place: it is a "travel itinerary with which to negotiate the interview" (McCracken, 1988: 37) that goes through all the main issues to cover without constraining the discovery. Finally data analysis is undertaken: literature, interviewee's experience and respondent's perspective should be pulled close each other, compared and contrasted in order to obtain sound results.

First of all, four not mutually exclusive strategies can drive data analysis (Yin, 2009):

1. relying on theoretical propositions implies the implementation of an iterative process based on the systematically comparison of (multiple sources of) evidence and theory and on the reshaping of theoretical constructs accordingly (that could implies the reaching of theoretical saturation in theory building case studies);

2. developing a case description helps in coping with all the collected data and "becoming intimately familiar with each case as a stand-alone entity" (Eisenhardt, 1989: 540)

3. using both qualitative and quantitative data in a synergic way can substantiate findings and frame theoretical foundations (Eisenhardt, 1989). "The case study does not imply the use of particular type of evidence… nor the use of a particular data collection method" (Yin, 1981: 59);

4. examining rival explanations is "an expected part of the scientific process and the hallmark of robust empirical work in many professions" (Kelly and Yin, 2006: 134) and it involves the use of the replication logic: "cases which confirm emergent relationships enhance confidence in the validity of the relationships. Cases which disconfirm the relationships often can provide an opportunity to refine and extend the theory" (Eisenhardt, 1989: 542)

Then, a specific analytical technique should be adopted. In general, all these techniques search for cross-patterns through the analysis of the data in divergent ways and with "the use of structured and diverse lenses" (Eisenhardt, 1989: 541). Logics for data analysis and dealing with problems of internal and external validity are: pattern matching, explanation building, time-series analysis and cross-case synthesis. The *pattern-matching logic* supports internal validity because relies on the definition of patterns of expected findings (with variation on dependent or independent variables) at the beginning of the case study and their later comparison with the empirical patterns. In particular, the pattern matching strategy can be defined, alternatively, according to the dependent variables (considering patterns of multiple and non-equivalent dependent variables/relevant outcome) or the independent variable (with patterns of rival explanations that equally lead to the same outcome). The *explanation building logic* is suitable for case study dealing with open–ended questions and could be conceived as a

special type of pattern matching. The main goal here is to develop new ideas for further investigation through an iterative process of explanation building: the definition of a final explanation is the result of the definition and re-definition of the starting theoretical propositions through findings and other plausible and rival explanations. *Time-series analysis* implies the positioning of case study key events into a chronological pattern that depicts not only the history of the case study itself but also the causal relations among the considered elements and the effect of major changes. The matching should be done on the basis of predefined theoretical trends or rival trends. A hybrid logic that recalls both the pattern-matching and the time-series logic is the so called *logic model*. It "deliberately stipulates a complex chain of events over an extended period of time. The events are staged in repeated cause-effect-cause-effect patterns, whereby a dependent variable (event) at an earlier stage becomes the independent variable (causal event) for the next stage" (Yin, 2009: 149). Hence, the analysis is defined by the comparison of empirically observed and theoretically predefined events. Finally, when dealing with multiple case studies, a *cross-case synthesis framework* based on the replication or corroboration logic is suggested. Through the analysis of cross-case patterns, the aim is to understand whether different cases hold similarities and can refer to the same "type". As stated before, direct replication implies the fulfilment of the same results from the multiple cases while theoretical replications infers that the multiple cases end with different results formerly stated in the research propositions.

In order to have a rigorous and systematic method, Miles and Huberman (1994) explain how to systematically analyse the data through an iterative three-step procedure that involve data storing, managing and processing. In the first step, raw data need to be selected and stored according to the conceptual categories and variables of analysis as articulated in the research design phase. The second step involves data management and display of variables or subgroups through the use of tables, diagrams, matrices, concept maps or spread-sheets that support the visualization of patterns and relationships among variables and categories as required in the third step of the data analysis. Finally, identified patterns and relationships, commonalities and differences are defined in conceptual terms. During data analysis, the process of coding takes place: "Codes are tags or labels for assigning units of meaning to the descriptive or inferential information

compiled during a study. Codes are usually attached to 'chunks' of varying size – words, phrases, sentences or whole paragraphs." (Miles and Huberman, 1994: 56). The coding process expresses the iterative side of the data analysis: after the "open coding" of all the statements, the researcher returns to the raw data and performs the so called "axial coding" in order to check the former codification, relate codes to each other and look for cross-codes evaluations and pattern analysis. Finally, selective coding takes place where both confirmatory and contradictory data are analysed to avoid the so-called confirmation bias.

Case study, generalization and scientific development. In 1979, Miles stated that "qualitative research on organization cannot be expected to transcend story-telling" (900). Moreover, "Some researchers may see the case study method as an alternative to 'mainstream' or positivist research methods and may be critical of an attempt to emulate the natural science model in data collection and analysis strategies" (Gibbert et al., 2008). Flyberrg (2006: 4) states that a typical misunderstanding in case study research is that: "One cannot generalize on the basis of an individual case; therefore, the case study cannot contribute to scientific development." However, the author rebuts that scientific development misjudged "the force of example": "The case study is well suited for identifying "black swans" because of its in-depth approach: What appears to be "white" often turns out on closer examination to be "black." Flyberrg (2006: 4). Moreover, Yin (2009) states the existence of two types of generalization: the statistical generalization, most suitable for surveys and archival data and the analytic generalization applicable for case study analysis. From a statistical point of view, a single case study or a small set of case studies (as sample of a larger population) cannot generalize or better infer to larger population or universe (as they represent only a small sample of the larger population). Moreover, statistical generalization cannot be applied to case study method because cases are not sampling units and are not choses following the so called sampling logic. On the contrary, case studies are selected as topic of interest for the development of an appropriate and clear theoretical framework and their interpretation re-echoes the replication approach to multiple case studies: if these cases support a theory and reject the rival explanation, analytical generalization is possible. Hence, "analytic generalizations depend on using a study's theoretical framework to establish a logic that might be applicable to other situations" (Yin, 2009: 18). This logic contains a two-steps

procedure. A first step "involves a conceptual claim whereby investigators show how their study's findings have informed the relationships among a particular set of concepts, theoretical constructs, or sequence of events. The second step involves applying the same theoretical propositions to implicate other situations, outside the completed case study, where similar concepts, constructs, or sequences might be relevant." (Yin, 2009: 18). Hence, the theoretical framework is the main vehicle for analytical generalization and this is the main reason because case studies are generalizable to theoretical propositions and not to populations or universe.

References

Denzin, N. K. 1978. *The research act: A theoretical introduction to sociological methods.* New York: McGraw Hill.

Denzin, N. K. and Y. S. Lincoln. 1994. "Introduction. Entering the field of qualitative research." N. K. Denzin and Y. S. Lincoln, eds., *Handbook of Qualitative Research*, Thousand Oaks – London - New Delhi: Sage.

Eisenhardt, K. M. 1989. "Building theory from case study research." *Academy of Management Review* 14: 532-550.

Flyberrg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, 12(2).

Gibbert, M. Ruigrok, W. and Wicki, B. (2008). Research Notes And Commentaries What Passes As A Rigorous Case Study? *Strategic Management Journal*, 29: 1465–1474.

Gibbert, M. and Ruigrok, W. (2010). The ''What'' and ''How'' of Case Study Rigor: Three Strategies Based on Published Work. *Organizational Research Methods*, 14(4): 710-737

McCracken G. 1988, The Long Interview, Newbury Park, CA: Sage.

Miles M. B. and A. M. Huberman. 1994. *Qualitative Data Analysis*. Beverly Hills: Sage.

Miles, M. B. (1979). Qualitative Data as an Attractive Nuisance. *Administrative Science Quarterly*, 24: 590.

Patton, M. Q. 1990. *Qualitative Research and Evaluation Methods*. Newbury Park: Sage.

Scholz, R. W. and Tietje, O. (2002). *Embedded Case Study Methods: Integrating Quantitative and Qualitative Knowledge*. Thousand Oaks: Sage Publications.

Yin, R. K. (2009). *Case Study Research Design and Methods* (4th ed.). Newbury Park, CA: Sage Publications

Yin, R. K. and Davis, D. (2007). Adding New Dimensions to Case Study Evaluations: The Case of Evaluating Comprehensive Reforms. *New Directions for Evaluation*, 113: 75-93.

Yin, R. K. 1984. *Case study research: Design and methods*. Beverly Hills: Sage.

Yin, R. K. (1981). The Case Study Crisis: Some Answers. *Administrative Science Quarterly*, 26(1): 58-65.

2. Structural Equation Model

Structural equation modelling is an hypothesis-testing statistical methodology that analyses causal relations between one or more dependent and independent variables according to given theoretical assumptions. These causal relations represent a series of structural (regression) equations and are supported by a clear theoretical conceptualization. The theoretical conceptualization (or the hypothesized model) is statistically tested in order to verify consistency with the collected data. Evaluation of model's goodness of fit can support the theoretical conceptualization or, in case of inadequate goodness of fit, can reject the causal relations among the considered variables.

As multiple regression defines coefficients minimizing the sum of squared deviations of the observed values for the dependent variable from those predicted by the model, structural equation modelling procedure minimizes "the difference between the sample covariances and the covariances predicted by the model" (Bollen, 1989:1).

Main concepts associated with this methodology are explained below.

<u>Latent and Observed variables</u> - The aim of structural equation modelling is to "explain the variation and co-variation in a set of observed variables in terms of a set of unobserved factors" (Long, 1983: 22). Latent variables or factor or unobserved variables or constructs are the abstract phenomena that cannot be directly observed. Typical examples of latent variable in public sector are the concepts of collaboration (Thompson et al, 2007), of public service motivation (Anderfuhren-Biget, S. et al., 2010) and the content and the process outcomes in Public Private Partnership (Steijn et al.,2010). Given the impossibility to directly measure latent variables, they can be operationalized through a direct link with measurement instruments that serve as indicators (or manifest or observed variables). These measurement instruments have to be intended as behaviour ("scores on a particular measuring instrument" Byrne, 2009: 5) believed to represent the latent variable and that make the latent variable measurable. Hence, these indicators are both the direct measures of observed variables and the indirect measures of latent constructs. Causality relations are expressed by the structural parameters that represent the links between unobserved variables, between observed variables and between observed and unobserved variable (Bollen, 1989).

Exploratory Factor Analysis - When the research aim is to explore the structure of a latent concept without any given links between unobserved and unobserved variables, Exploratory Factor Analysis (EFA) takes place. EFA, in fact, doesn't presume any strong theoretical consideration on causal relations between construct and measures. It explores how and to what degree the observed variables refer to the latent factor. In detail, researchers aim at identifying the latent factors at the basis of the covariation among measured variables. EFA is a data-reduction technique for identifying clusters of variables that highly correlate together but do not correlate with the variables outside of that cluster. On the contrary, when the researcher has a sound knowledge of the structure of the latent variable, that is, of the observed variables that contribute to the measurement of the latent concept, structural equation models need to be used.

In particular, structural equation model is composed of two different but deeply interconnected models: Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM).

Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) - The structural equation model is composed of two different but deeply interconnected models: a measurement model (CFA) and a structural model (SEM). CFA, the so called measurement model, focuses only on the links between factors and their measures (without causal relations among latent constructs). CFA supports and tests the relations between each latent factor and the relative observed indicators and it represents only a portion of the general model (with causal relations among variables). CFA aims to define how each measure loads on a particular given factor and to explore the reliability and validity of each latent construct. Structural equation model is focused on the definition of causal relations (regression) among different latent variables and according to a theoretical conceptualization. A model is defined as a full latent variable model when it integrates both the measurement and the structural model: it represents both the relationships between latent constructs and measures and the causal relations among latent constructs.

The figure below represents the hypothesized full latent variable model presented in the second article of this dissertation. It outlines the system of structural equations linking both latent constructs and latent constructs to measures, according to what

emerged from the systematization of the existing literature on public network performance.

FIGURE 1. *Hypothesized full latent variable model*
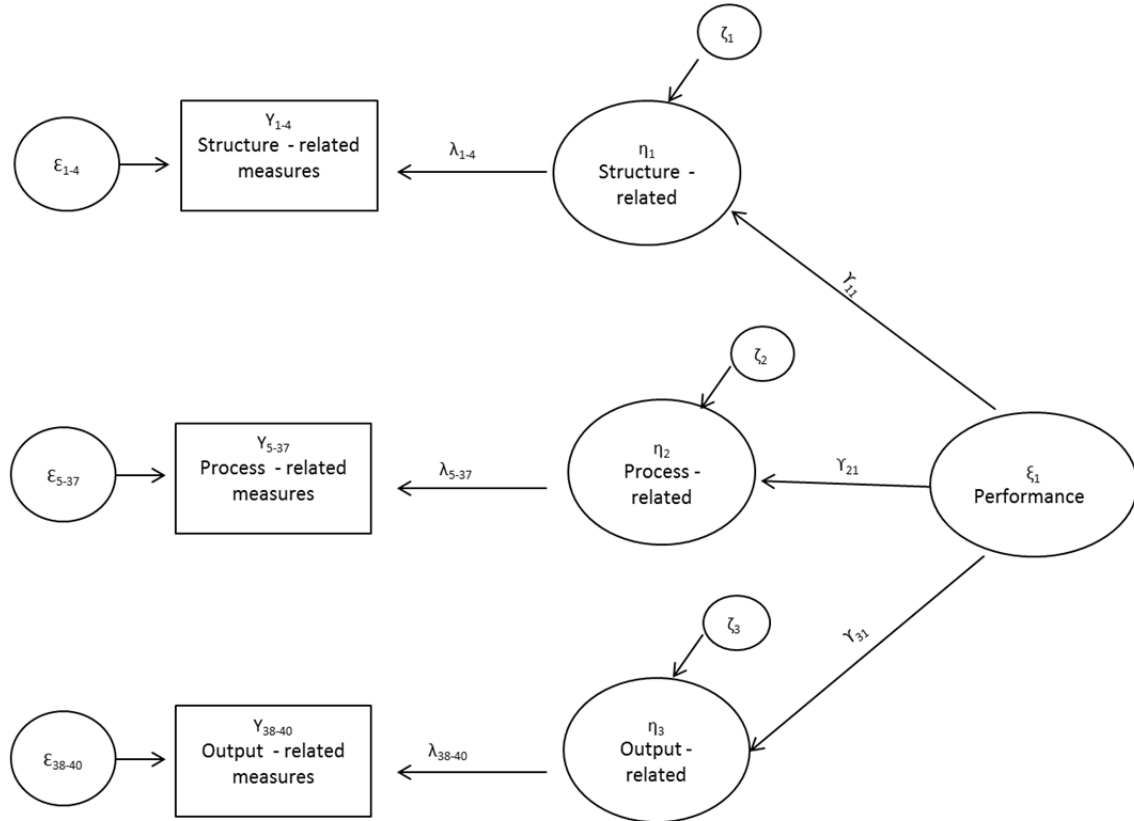
Ullman (2006) supports a four steps process of estimating CFA and SEM: (I) Model Specification and Hypothesis, (II) Model Estimation Techniques, (III) Model Evaluation and (IV) Model Modification.

(I) Model Specification - In a first step, the researcher specifies the model and the relative hypothesis according to given theoretical considerations. Usually, path diagrams are used to graphically represent the parameters to be estimated (regression coefficients and variances and covariances of the independent variables). Then, the model has to be translated into equations capturing the variables (both observed and latent) and these parameters.

Model specification requires the specification of the system of structural equations linking both latent variables and latent variables to observed variables.

Latent variables could be divided into exogenous and endogenous. The exogenous ones (ξ) are the independent latent variables that determines (or causes) other latent

variables; external factors, not the model, explain changes in their values. The endogenous ones (η) are the dependent latent variables influenced by the exogenous latent variables. The model is supposed to explain the fluctuations in their values.

The general matrix representation of the structural equations for the latent variable model is represented by the equation below:

$$\eta = \beta\eta + \Gamma\xi + \zeta$$

where η is a m x 1 vector of the latent endogenous variable, ξ is a n x 1 vector of the latent exogenous variable and ζ is the error term (m x1 vector) associated with η and representing the effect on η of the variables omitted from the equation.

β (m x m vector) and Γ (m x n vector) are the coefficient matrixes respectively for the latent endogenous variables and the latent exogenous variable. Besides, the model requires also two covariance matrices. According to Bollen (1989: 15) "a covariance matrix is un unstandardized correlation matrix with the variance of the variable on the diagonal and the covariance of all pairs of variables in the off-diagonal". Φ is the n x n covariance matrix of the latent exogenous variable and Ψ is the m x m covariance matrix of the latent endogenous variable.

The measurement model is the part of the equations that links latent variables with observed variables. Observed variable (or measures) are represented by Roman letters: x variables are the exogenous ones and y the endogenous ones. The measurement model can be specified both through exogenous (x variables) and endogenous (y variables) notations through the following matrices and vectors:

$$x = \Lambda x\xi + \delta$$

$$y = \Lambda y\eta + \varepsilon$$

where x and y are respectively the measures of the latent exogenous variable and the latent endogenous variables; Λx (q x n matrix) and Λy (p x m matrix) comprehend the structural coefficients between observed and latent variable (ξ and η) and δ (q x 1) and ε (p x 1) are the vectors of the errors of measurement.

Finally, other two matrices represent the covariance matrices of the error of measurement: Θδ (q x q) and Θε (p x p).

"A model is said to be identified if there is a unique numerical solution for each of the parameters in the model" (Ullman, 2006). Consequently, a first requisite is that data points (the number of non-redundant variances and covariances) must be more than the

parameters to be estimated; latent factors must be scaled fixing at 1.00 the regression coefficient of one of the measured variables.

(II) Model Estimation Techniques - Once model specification is concluded, estimation takes place. The goals of this phase is to "minimize the difference between the structured and unstructured estimated population covariance matrices" (Ullman, 2006; p.43). If Σ is the population covariance matrix of observed variables and $\Sigma(\theta)$ is the covariance matrix of the vector of model parameters (θ), estimation process aims at most closely replicating the covariance matrix of the observed measures.

In EFA, the observed correlation matrix is compared with the reproduced or implied one while in SEM a statistical test of the difference between the two matrix is included with a chi-square test statistic.

There are different estimation techniques: ML - Maximum Likelihood (set as the default) or GLS – Generalized Least Squares when data are normally distributed; ADF – Asymptotically Distribution Free when we do not want to set assumptions.

The most common estimation technique in SEM, in fact, assumes multivariate normality and requires the examination of both univariate and multivariate normality of the data sample. Univariate normality is evaluated by the analysis of outlier and skewness and kurtosis indexes. Mardia's coefficient and Mahalanobis distance evaluate respectively multivariate normality and multivariate outliers. In SEM it is possible to deal with non- normally distributed variables choosing an estimation method that takes into account the non-normal distribution. In fact, even if ML estimation is the most common method, it is possible to avoid the multivariate normality issue using the ML estimation with the Satorra-Bentler scaled chi-square (1988, 1994, 2000) also called Robust Maximum Likelihood. It adjusts the chi-square and the standard errors estimates by a scaling factor based on the data non-normality.

(III) Model Evaluation – Evaluation of the model should be assessed at two levels: measurement model and overall fit measures.

Firstly, it is important to assess the measurement model (Fornell and Larckel, 1981). For each latent variable, it is important to investigate reliability, convergent and discriminant validity.

Reliability implies the evaluation of internal consistency of the latent variable. The index of composite or construct reliability (Fornell and Larckel, 1981) is a measure of

scale reliability of each latent construct that range from 0 to 1 with a cut-off at 0.70. This index is similar to Cronbach's Alpha but has not the problem to be sensitive to sample size. Validity entails that all observed variables effectively measure what they are assumed to measure and involves the analysis of convergent and discriminant validity. Convergent validity requires both the estimated parameters (λ) for each observed variable to be high in value and statistically significant (Anderson and Gerbin, 1998) and the analysis of the Average Variance Extracted (AVE). The AVE evaluates the reliability of the construct in term of the "amount of variance that is captured by the construct in relation to the amount of variance due to measurement error" (Fornell and Larckel, 1981: 45). If AVE is less than .50 "the variance due to the measurement error is larger than the variance captured by the construct and the validity of the individual indicators as well as the construct is questionable" (Fornell and Larckel, 1981: 45). Discriminant validity is the extent to which a measure of a construct differs from measures of adjacent constructs (Fornell and Larcker, 1981): it evaluates the variance shared between different constructs and hence if construct are effectively unrelated. Test for discriminant validity requires that, given two constructs, AVE of each construct is higher than the correlation (γ) between the two latent constructs. This requirement needs to be satisfied for each pair of latent variables.

Overall fit measures evaluate the adequacy of the model in terms of the difference between the observed correlation matrix and the implied one: the smaller the difference, the closest the model fit. There exist different measures and academics don't share a common consensus.

First of all, absolute fit indices are presented. These indices refer to how well the a priori model fits the data in comparison to no model at all:

• The chi-square "assesses the magnitude of discrepancy between the sample and fitted covariances matrices" (Hu and Bentler, 1999: 2). Good fit requires a statistical insignificant result a 0.05 level while threshold. Given the numerous limitations in its use, especially due to its sensitiveness to the sample size, researchers have provided alternatives indices such as the relative/normed chi-square (chi-square/df) which should range from 1 and 3.

• The Root Mean Square Error of Approximation (RMSEA) "tells us how well the model, with unknown but optimally chosen parameter estimates would fit the

populations covariance matrix" (Hooper et al, 2008: 54). Driven by parsimony, this index should range between 0.08 and 0.10 for mediocre fit and below 0.08 for good fit. However, recently most rigorous cut-off (such as 0.07) have been supported.

• The Goodness of Fit (GIF) focuses on the variance and covariance matrix and "shows how closely the model comes to replicating the observed covariance matrix" (Hooper et al, 2008: 54). It ranges from 1 to 0 and the traditional cut-off point is set at 0.95. Given the sensitivity of this index to sample size, an alternative index which adjust the GFI to the model's degree of freedom has been defined: the Adjusted Goodness of Fit (AGIF). It also range from 0 to 1 and its cut-off point is generally set at 0.90.

• The Root Mean Square Residuals (RMR) and the Standardized Root Mean Square Residuals (SRMR) "are the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model" (Hooper et al, 2008: 54). The SRMR is commonly used because it solves interpretation problems of RMR. Values of the SRMR can go from 0 to 1 and values lower that 0.08 are considered acceptable.

Incremental fit indices compares the chi-square value to a baseline model with the null-hypothesis that all variables are uncorrelated (Hooper et al, 2008):

• The Normed-fit Index (NFI) compares the chi-squares of the two models. Values are comprised between 0 and 1 and the threshold is usually set at values greater than 0.95. However, NFI index is considered sensitive to sample size and could underestimate small samples. The Non- Normed-fit Index (NNFI) overcomes this drawback with good model threshold fixed at 0.95.

• The Comparative Fit Index (CFI) is a reviewed form of the NFI not affected by sample size. Given this property, the CFI is the most common incremental fit index and recommended values for good fit are greater than 0.95 (it ranges from 0 to 1).

(IV) Model Modification - Modifications of the model could be important in order to verify theoretical hypothesis or improve model fit. This last option, however, changes the analysis premises from confirmatory to exploratory and "any conclusion that has undergone substantial modification should be viewed with extreme caution" (Ullman, 2006: 46).

The most common method for the evaluation of model modifications is the chi-square difference. Along with model modification, we obtain two model to compare: a

nested model and a comparison model. The nested model can be conceived as a subgroup of the comparison one because it has lower degrees of freedom and, hence, its freely estimated parameters are a subset of the freely estimated parameters of the comparison model. The chi-square difference procedure implies the analysis of statistical significance of the chi-square difference between the two nested model given their degrees of freedom difference. When the data follow a normal distribution, it is only necessary to subtract the two ML chi-square. However, when data are non-normally distributed and the Satorra and Bentler chi-square is used, a scaling correction is required in order to compare nested models ML chi square. In detail, scaling correction (sc) is calculated as follows (Satorra, 2000; Satorra and Bentler, 2001):

$$sc = \frac{(dfnest)\left(\frac{X^2MLnest}{X^2SBnest}\right) - (dfcomp)\left(\frac{X^2MLcomp}{X^2SBcomp}\right)}{dfnest - dfcomp}$$

This scaling correction is used together with ML chi-square values to determine the statistical test for SB chi-square difference:

$$X^2SBdifference = \frac{X^2MLnest - X^2MLcomp}{sc}$$

If the chi-square difference is not significant, we have to decide for the more parsimonious structural model, that is the so-called comparison model, with higher degree of freedom and higher chi-square. On the contrary, if the difference is statistically significant, we should opt for the nested model that with lower degrees of freedom supports a significant improvement (a diminution) in chi-square fit index. The chi-square difference is a useful test for the analysis of the total, direct and indirect effects. The direct effect is the effect from one variable to another without mediation from any other variable. The indirect effect is its effect to another variable mediated by at least another intervening variable. The total effect is the sum of the direct and indirect effect. Since "the decomposition of effects is always with respect to a specific model" (Bollen, 1989: 36), the introduction or exclusion of one or more variables into the structural equation model could change the total, direct and indirect effects.

References

Anderfuhren-Biget, S., Varone, F., Giauque, D. and Ritz, A. 2010, "Motivating Employees of the Public Sector: Does Public Service Motivation Matter?", *International Public Management Journal,* 13, 3, 213-246.

Anderson, J.C. and Gerbing, D.W 1988, "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin,* 103, 411-23.

Anderson, J.C., Gerbing, D.W. and Hunter, J.E. 1987, "On the Assessment of Unidimensional Measurement: Internal and External Consistency, and Overall Consistency Criteria", *Journal of Marketing Research (JMR),* 24, 4, 432-437.

Bollen, K.A. 1989, *Structural Equations with Latent Variables. Wiley Series in Probability and Mathematical Statistics.* New York: Wiley.

Bollen, K. A. and Hoyle, R. H. 1990, "Perceived Cohesion: A Conceptual and Empirical Examination", *Social Forces,* 69, 2, 479-504.

Bollen, K.A. 2000, "Modeling Strategies: In Search of the Holy Grail.", *Structural Equation Modeling,* 7, 74-81.

Byrne, 2009. *Structural Equation Modeling With Lisrel, Prelis, and Simplis: Basic Concepts, Applications, and Programming.* 3rd edn. Mahwah, NJ: L. Erlbaum Associates.

Fornell, C. and Larcker, D.F. 1981, "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research,* 18, 1, 39-50.

Hooper, D., Coughlan, J. and Mullen, M.R. 2008, "Structural Equation Modelling: Guidelines for Determining Model Fit", *Electronic Journal of Business Research Methods,* 6, 1, 53-59.

Hu, L.T. and Bentler, P.M. 1999, "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives", *Structural Equation Modeling,* 6, 1, 1-55.

Long, J.S. 1983, *Confirmatory factor analysis: a preface to LISREL,* SAGE.

Satorra, A. and Bentler, P.M. 1994, "Corrections for Test Statistics and Standard Errors in Covariance Structure Analysis" in *Latent Variable Analysis: Applications for*

Developmental Research, ed. Von Eye, A. and Clogg, C., Sage., Thousand Oaks, CA, 399-419.

Satorra, A. and Bentler, P.M. 1988, "Scaling Corrections for Chi-square Statistics in Covariance Structure Analysis", *Proceedings of the American Statistical Association*, 308-313.

Satorra, A. and Bentler, P.M. 2001, "A scaled difference chi-square test statistic for moment structure analysis", *Psychometrika*, 66, 4, 507-514.

Steijn, B. Klijn, E. and Edelenbos, J. 2010, "Public-Private Partnerships: Added Value By Organizational Form Or Management?", *Public Administration,* 89, 4, 1235–1252.

Thomson, A.M., Perry, J.L. and Miller, T.K. 2007, "Conceptualizing and Measuring Collaboration", *Journal of Public Administration Research and Theory,* 19, 1, 23-56.

Ullman, J.B. 2006, "Structural Equation Modelling: Reviewing the Basics and Moving Forward", *Journal of personality assessment,* 87, 1, 35-50.