



Public network leadership and the ties that lead

Daniela Cristofoli¹ · Benedetta Trivellato² · Alessandro Sancino³ ·
Laura Maccio⁴ · Josip Markovic⁴

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Abstract

This study explores how certain characteristics of the network structure, such as autonomization and connectivity, differently combine with individual leadership in order to produce high network performance. Data gathered through a survey of 265 networks for homecare assistance shed light on three different paths simultaneously leading to network success. First, the presence of autonomy from government (autonomization) appears to be able to ensure network success, irrespective of the other conditions. Secondly, the presence (or absence) of an individual network leader combines differently with the network's connectivity. Sparsely connected networks seem to require a network leader, forging agreements and leading partners towards a common objective. On the contrary, in highly connected networks, it is the intensity of network ties that appears to lead the network (the network leader seems to be not important). These networks seem to be leaderless, but not necessarily leadershipless.

Keywords Public management · Leadership · Public networks · Public services · Network management

Laura Maccio' and Josip Markovic were PhD candidates at Università della Svizzera Italiana, Lugano, Switzerland.

✉ Alessandro Sancino
alessandro.sancino@open.ac.uk

Daniela Cristofoli
daniela.cristofoli@unimib.it

Benedetta Trivellato
benedetta.trivellato@unimib.it

- ¹ Department of Business and Law, University of Milano-Bicocca, Milano, Italy
- ² Department of Sociology and Social Research, University of Milano-Bicocca, Milano, Italy
- ³ Department of Public Leadership & Social Enterprise, The Open University, Milton Keynes, UK
- ⁴ Università della Svizzera Italiana, Lugano, Switzerland

1 Introduction

Leadership in public networks is a controversial topic (e.g. Currie et al. 2011; Huxham and Vangen 2000; Mandell and Keast 2009; Morse 2010). As networks are organizations that are characterized, to a greater or lesser extent, by the sharing of power and responsibilities, one may see ‘leader’ and ‘network’ as clashing terms. As noted by Huxham and Vangen (2000, p. 1167), “the notion of a leader with a hierarchical relationship to followers does not apply in collaborations, so the potential for exercising ‘decisive leverage’ by virtue of a formal position is reduced”. The relationship between leadership and networks has recently received attention by several studies (McGuire and Silvia 2009; Silvia 2017) with a general agreement to move from the idea of a single individual towards shared, distributed and collective leadership (Ospina and Foldy 2010). However, we should ask ourselves whether this is a more normative/desirable element of leadership, or whether the reality of public networks is that of a distributed, shared and collective leadership. This is an important and timely conversation around the nature of contemporary leadership, especially at a time when we see examples of Trumpism and “*great man leadership*”, and examples of communityship and adhocratic forms of organizing characterized by notions of collective leadership (Crosby and Bryson 2017; Mintzberg and Caldwell 2017).

Our feeling is that there is not one form of leadership (i.e., individual, shared, or collective) fitting all possible situations, but that, probably, different forms of leadership are preferable in different network settings. In this perspective, the idea of a single individual leader is not necessarily an anachronistic one; in fact, individual leadership may be the best solution in combination with certain network characteristics.

Exploring those combinations is the aim of our article. In particular, we are interested in exploring when individual leaders in networks do indeed exist in combination with two specific network characteristics—network autonomization and connectivity—selected on the basis of the previous literature (Wright and Pandey 2010). Thus, we explore in this paper the combinations of network autonomization, connectivity and individual leadership leading to high network performance.

Public networks for the provision of homecare assistance to the elderly in Switzerland provide the empirical setting for our study. Data were collected through a survey administered to the networks’ directors: 523 directors were contacted and 265 agreed to participate in our study with a response rate of 46.1%. Network directors were surveyed about network characteristics, individual leadership, and network performance. As a consequence, the research and its results deal more properly with a perceptual measure of network performance. The configurational approach of Qualitative Comparative Analysis (QCA, Ragin 1987, 2008) was chosen to analyse the data.

The results shed light on three different paths leading to (perceived) high network performance, which present different pictures in terms of the role of the individual network leader in combination with the characteristics of the network structure and context. The first path involves autonomy from government; the second involves loosely connected networks, and presence of an individual network leader; the third involves highly connected networks, and no single network leader. Whereas the

latter networks seem to be leaderless, probably they rather boast ties that produce leadership, and therefore are not leadershipless. In this perspective, our results, on one side, confirm the idea that individual leadership fits with networks with specific characteristics (i.e. low levels of connectivity), on the other side, they suggest that leadership plays a crucial role for network success, either in the form of a leader's presence, as in our second path, or in the form of ties that lead, as in our third path. The results also shed light on the role of autonomization as a condition able to lead to network success, irrespective of the network's connectivity and the presence, or absence, of an individual leader.

The results contribute to existing studies and managerial practices in multiple ways. From a theoretical standpoint, first, they contribute to the exploration of the importance and the characteristics of leadership in public networks. Secondly, they contribute to the diffusion of a configurational approach to the study of public networks (Verweij et al. 2013; Raab et al. 2015; Wang 2016; Cristofoli and Markovic 2016; Warsen et al. 2019). From a managerial standpoint, our results provide public managers with important insights about the design and the leadership of networks, whereas from a policy point of view they contribute to build a more refined view of the relationship between successful public service delivery and autonomy from government.

The paper is organised as follows: the next section provides the theoretical background and is followed by the methodological section which also describes the empirical setting and the data. The subsequent section illustrates the findings, which are then discussed in the final section together with their theoretical and practical implications, and with the limitations of our research.

2 Literature review

2.1 The evolution of public leadership studies: leader and leadership

Ospina (2017) recently drew attention to “the benefits of further embedding the public leadership research domain within leadership studies” (p. 275).

Originally, studies on leadership assumed a leader-centred approach and saw the concepts of leader and leadership as overlapping (Crosby and Bryson 2017). They sought to identify the list of personality characteristics and physical attributes that make an individual the ideal leader. However, this approach has rapidly shown its limitations, not only because the set of traits as a whole is difficult to obtain, but also because it neglects the contexts where leaders operate (Silvia and McGuire 2010). Researchers therefore began to focus on leaders' behaviours, as in the ‘transformational era’ of leadership research (Van Wart 2003) where cultural change, vision, and charisma are central (Silvia and McGuire 2010). However, the primary source of leadership in transformational leadership theory is still the leader, with followers being engaged in activities which generate motivation and efficacy to produce the desired results (Ospina 2017). Within this mainstream, although the interaction between leader and follower is expected to transform both, influence flows primarily

from leader to follower, resting on the authority of the leader (Bellé 2014; Wright and Pandey 2010).

Subsequent contributions have moved from this perspective by viewing leadership as a relational process where leaders and followers interact in mutually beneficial ways, and by looking at leadership as a property of a system that encompasses human relationship (Crosby and Bryson 2017; Kellerman 2016). LMX (leader-member exchange) theory, for instance, focuses on the dyadic relationship between the leader and the follower, and proposes that the effectiveness of leadership is dependent on the quality of such relationship (e.g. Graen and Uhl-Bien 1995). Public leadership studies within this approach have explored impacts on organizational variables (e.g. Tummers and Knies 2013; Hassan and Hatmaker 2015), and showed, for instance, that high-quality relationships between public managers and employees improve organizational outcomes. Whereas this approach is less leader-centered, as it highlights the relationship between the leader and the follower/member, it still remains person-centered (Ospina 2017).

Hence, other contributions within the organizational and the public sector literature have moved towards a perspective which looks at the collective dimensions of leadership and its relational characteristics. In the private sector domain, these studies see leadership as an influence process among group members where leader and follower roles tend to be fluid and rotating, and where understanding the context is key to appreciate such fluid nature of the relationship (Ospina 2017). In the public domain, Van Wart (2013) identifies a type of public sector leadership which “emphasizes collaborative processes leading to shared outcomes among agencies and sectors, and greater democratic accountability to ensure responsiveness and inclusiveness” (p. 531). This model has also been labelled facilitative leadership, collaborative leadership, and public value leadership (e.g. Ansell and Gash 2012; Crosby and Bryson 2017; Wallis and Gregory 2009). The emergence of this model results to a great extent from the paradigm shift from the hierarchical approach to the New Public Management, and later to the New Public Governance, and from scholars moving away from the idea that leadership in the public domain resides in a single individual (Ospina 2017). Notions of individualistic leaders have been replaced by labels such as collective, distributed, and shared leadership (Crosby and Bryson 2017), with a focus on the relational nature of such concepts, as well as systemic, horizontal or network leadership (Bolden 2011) driven by the need to study leadership in complex contexts characterized by multiple relationships and levels of action (Ospina 2017).

2.2 Leadership in public networks

Leadership in public network is a controversial topic.

Some authors argue that the nature of networks as flat and non-hierarchical organizations hinders the emergence of leadership. Other authors, on the contrary, sustain that whereas collaborative networks cannot, by their nature, feature a heavy and centrally directed control, this does not imply absence of direction or control,

but rather that there needs to be a balance between providing direction and letting things emerge (Popp et al. 2014).

In this perspective, several scholars (e.g. Keast et al. 2004; Provan and Huang 2012) suggest that network leaders may play a key role as they set the terms for network participants to operate and interact, while also maintaining the flexibility that is needed to achieve results at the network level. The concept of ‘integrative leadership’ (Crosby and Bryson 2010) is used by Morse (2010) and Silvia and McGuire (2010) as they refer to leadership in a multi-actor or network setting and explore the extent to which it is different from leadership in single agency contexts. The latter authors, for instance, identify the behaviours that public managers display in their roles as network leaders, and then compare them to those displayed by the same managers in their home organizations. They find that integrative leaders approach network members as equals, share information across the network, share leadership roles, create trust, and are aware of the external environment to identify resources and stakeholders. Overall, when leading in a network context, managers display a higher proportion of people-oriented behaviours while, when leading in a single agency context, they displayed more task-oriented behaviours.

As a concurrent development in the evolution of the literature, collective leadership theories shift the core of leadership from the visible leader to the processes that make leadership work evident (Ospina and Foldy 2015), and explicitly differentiate the leader from leadership (Crevani et al. 2010). According to the proponents of these theories, the source of leadership is found at the level of the system of relationships (the collective) as opposed to the individual or relationship levels. For example, Huxham and Vangen (2000, 2005) use a collective leadership framework to explore structure, processes, and participants as separate sources of network leadership. They also explore ‘contextual leadership’ (informal, emergent, and shared) and other leadership mechanisms and activities that emerge from collaboration. Within the collective leadership literature, the constructionist view highlights how “meaning-making processes associated with leadership also become visible as *practices*—recurrent ways of doing things that group members experience as good solutions to their attempts at organizing.” (Ospina 2017, p. 281, see also Ospina et al. 2012).

Even if all these approaches converge in emphasising the importance of leadership in public networks, more recent works show that particular contexts shape how leadership happens, when and who takes up different roles, and what form leadership actually takes, singular or plural (Ospina 2017). However, it is not clear how certain features of a network’s structure may encourage or discourage certain leadership patterns, which is the focus of the next section.

2.3 The relationship between organizational structure and public network leadership

Within the growing body of literature on public networks, few studies (e.g. Currie et al. 2011; McGuire and Silvia 2009; Murphy et al. 2017) investigate the relationship between network structure and leadership in highly performing networks.

However, the influence of the organizational structure on leadership is a much longer- debated issue in public administration studies. Several scholars argue that the characteristics of public organizations, as bureaucratic organizations, naturally hinder the emergence of leadership (Rainey and Watson 1996; Bass and Riggio 2006). According to them, the need for stability, predictability and standardization that characterises bureaucratic organizations leads naturally to the introduction of hierarchies, procedures, rules and formalized mechanisms that limit and constrain individual autonomy and discretion. In this situation, these scholars argue that there is no room for the emergence of leaders in public organizations (Aiken and Hage 1966; DeHart-Davis and Pandey 2005; Bass and Riggio 2006). Despite these theoretical arguments, many empirical studies have proved that leadership practices are common and effective in public organizations (Lowe et al. 1996; Dumdum et al. 2002). Wright and Pandey (2010) argue that probably this happens because public organizations are less bureaucratic than one may believe. In this perspective, in their study of senior managers in local governments, Wright and Pandey (2010) explore the impact of a selection of bureaucratic characteristics (such as hierarchy, lateral/upward communication and organizational formalization) on leadership practices. They conclude that certain bureaucratic characteristics have little, if any, adverse effect on the emergence of leadership. In fact, they note that although organizational hierarchy and inadequate lateral/upward communication were associated with lower leadership behaviours in their study, no relationship was found between leadership behaviours and two types of organizational red tape. Their results suggest that the relationship between structural characteristics, on one hand, and the emergence of leadership, on the other, may be less straightforward than it appears.

Given the lack of studies that address the relationship between structure and leadership in network settings and taking the cue from Wright and Pandey (2010), we can assume that the emergence and effectiveness of leadership in public networks may be related to the network's structural and contextual characteristics. The importance of the organizational structure as it influences the leadership space is shown to be relevant in networks, for example if we think about centrally-governed networks, where a lead organization or a NAO manages and governs the network (Kenis and Provan 2009; Provan and Kenis 2008).

In this perspective, we build on the results reached by Wright and Pandey (2010) with reference to public sector organizations by seeking to adapt their constructs to public network settings. While we are aware of the differences between public sectors organizations and public networks, we believe that certain insights provided by the authors may be fruitfully combined with relevant contributions from the public networks literature.

For instance, Wright and Pandey (2010) identify as a common theme among extant leadership theories that “leadership requires employees (both leaders and followers) to have a certain degree of flexibility in how they define and perform their work” (p. 77). As this concept closely resembles the degree of autonomy enjoyed by the organization's members when performing their tasks, we propose that autonomy from government (or autonomization, in Kort and Klijn's 2011 parlance) within public networks may also have an influence on the emergence of network leadership. The relationship between autonomy from government and managerial practices is

not a new topic in the public network literature. By focusing on networks in the field of urban regeneration projects, Kort and Klijn (2011) looked at the relations between government and networked organizations. They defined autonomization as “the degree to which the organization has discretionary powers to make independent decisions on various matters, including the use of its financial resources, its organizational structure, and project-related plans”, and contraposed it to managerial behaviours. Based on New Public Management arguments, Kort and Klijn (2011) showed that the lower is the degree of public control, the higher the managerial autonomy, thus creating room for the emergence of leadership. The results of their study proved that network managers need to take the lead of public networks in order to make them achieve their outcomes, thus suggesting the existence of a relationship between autonomy from government and leadership.

In addition to autonomization, the second structural characteristic that we wish to explore as it relates to the emergence of network leadership is network connectivity. Whereas Wright and Pandey (2010) find weak lateral/upward communication to be associated with a lower prevalence of leadership behaviours at the organizational level, the relationship between connectivity and leadership in networks is still a controversial issue. Highly connected networks might distort or enhance leadership (Balkundi and Harrison 2006). According to Balkundi and Kilduff (2006), this depends on the individual predisposition of network members towards the leader. Members of highly connected networks influence each other, as they tend to share trust, similar values and attitudes. In this perspective, when members are negatively inclined towards leaders, the emergence of leadership might be difficult. On the other side, highly connected networks of people who are favourably disposed towards the leader represent a pool of resources for the emergence of leadership. Based on these considerations, a relationship between connectivity and leadership seems to exist, even if it is not clear yet if connectivity distorts or enhances leadership.

3 Method

The aim of our article is to understand when individual network leadership is able to ensure high network performance in combination with certain network characteristics (autonomization and connectivity). In other words, our aim is to explore which combinations of autonomization, network connectivity and individual leadership can simultaneously lead to high network performance. For this purpose, and coherently with the explorative nature of our study, we chose the Qualitative Comparative Analysis (QCA) as our research method (Ragin 1987, 2008). Owing to the principles of complex causation and equifinality (Ragin 1987, 2008), QCA allows, in fact, to overcome the idea of a mono-causal explanation for outcomes, typical of statistical analysis. It allows to identify, instead, alternative combinations of factors (or configurations of conditions in QCA parlance) that are simultaneously able to lead to the expected outcome.

We opted for fuzzy-set QCA (fsQCA) (Rihoux and Ragin 2009), which allows the scaling of membership scores in the interval between 0 (non-membership) and 1 (full membership) and is therefore particularly suitable to analyze survey data. As

Emmenegger et al. (2014, p. 1) argue, “Likert-scaled survey items let respondents make qualitative statements of agreement, disagreement and indifference. Fuzzy sets can capture these qualitative differences in a way that classical interval scaled indicators cannot”.

3.1 Empirical setting and data collection

The empirical setting for our study is represented by public networks set up in Switzerland to provide homecare services to those, mainly elderly, who are unable to take care of themselves. They are inspired by the principle that patients should be treated to the extent possible by trained personnel in a well-known setting, with a positive impact on their autonomy and self-determination. The networks result from the establishment by Swiss municipalities of new organizations in forms such as consortia, foundations and associations, which directly provide certain home care services. Other additional and complementary services—such as transportation, meal provision, night care, psychological support, and so on—are supplied by other private and non-profit organizations. As a consequence, the service provision system takes the form of a network that includes two types of partners in addition to the central organization: the private and non-profit organizations that provide complementary services, and the municipal and Cantonal governments. Because of the Swiss federalist structure, these networks are quite varied in terms of their governance form: in some cases, it is the Cantonal Government that directly mobilizes the central organization and other ancillary organizations to supply home-care assistance, whereas in others the local government entrusts the central organization with the responsibility to provide services, activate other organizations, and administer the network. In yet other cases, the central organization is again in charge of all the above responsibilities, but modifies its structure into a headquarter that administers the network, and a number of subsidiaries that supply services and activate non-profit organizations as necessary.

Data were collected through a survey administered to the network directors operating in Switzerland in 2012. A total of 575 networks were contacted by e-mail or phone, 523 accepted to participate in the survey and 265 actually filled in the questionnaire, with a response rate of 46.1%. Following a quality check on the data gathered, 49 cases were dropped from the database, thereby leaving 216 cases for the analysis. The characteristics of the networks participating in the survey are shown in Table 1.

Network directors were surveyed about network characteristics such as autonomization and connectivity. As they interact with both municipalities and the Cantonal Governments, on one side, and the network partners, on the other side, network directors have the experience and extensive knowledge needed to answer our questions. They were also surveyed about individual network leadership. One may think that network directors are by definition also individual network leaders. This is not necessarily the case. Networks may be leadershipless, or other forms of leadership (different from the individual leader) might be present. As better explained later, we asked network directors to indicate who performs certain activities (that

Table 1 Characteristics of the networks

Geographical area	87.6%	German-speaking Cantons
	12.4%	French-speaking Cantons
Legal status	75.7%	Association (Private Law)
	6.4%	Foundation (Private Law)
	17.4%	Municipal Department (Public Law)
Catchment area (2011)	1800.00	Minimum
	720,000.00	Maximum
	25,428.87	Mean
	65,640.70	Std. deviation
Number of clients per year (2011)	16.00	Minimum
	29,000.00	Maximum
	694.96	Mean
	2398.19	Std. deviation

are identified by the extant literature as typical of the network leader) within a scale from 1 to 7, where 1 corresponds to nobody, 4 to institutional bodies performing such activities in a bureaucratic and administrative way (without taking a real leadership role), and 7 to the network director. Only when all these activities are performed by the network director (all the scores are equal to 7 along all the questions) we can say that we have an individual network leader, and s/he corresponds to the network director. Finally, network directors were surveyed about network performance. Since we used a survey enquiring about directors' perceptions about the different factors, our study builds on self-reported measures.

The questionnaire was translated in all Swiss national languages and administered both via web and through a paper-based format. Two reminders were sent to increase the response rate.

3.2 Operationalization and calibration

The three conditions (network autonomization, connectivity and individual leadership) and the expected outcome (network performance) are measured through questionnaire items, with response options measured on a seven-point scale, ranging from 1 to 7. Some items are based on previous studies as indicated in [Annex](#); others are newly developed. Cronbach's alpha was used to test the internal consistency and reliability of the proposed scales. All of them exhibited a Cronbach's alpha higher than the generally accepted threshold of 0.7 (see [Annex](#)). All the conditions and the expected outcome were constructed as the sum of the relevant items as detailed below and in the [Annex](#).

3.2.1 Network autonomization

Kort and Klijn (2011, p. 619) define 'autonomization' (i.e. autonomy from government), as the "degree to which the organization has discretionary powers to

make independent decisions on various matters, including the use of its financial resources, its organizational structure, and project-related plans". As a consequence, on the basis of Kort and Klijn (2011), network autonomization was measured as the sum of six items ($\alpha=0.826$), i.e. the ability to take their own decisions about the provision of homecare services, the definition of their own mission and vision, the definition of their own long and/or medium term program, the definition of their own objectives, the organization of inputs and tasks and the use of financial resources.

3.2.2 Network connectivity

Connectivity measures the extent to which all network organizations are interconnected, or linked to one another, and reflects network cohesiveness or density (Provan and Milward 1995; Provan and Kenis 2008). Scott (2000, p. 69) defines network density as "the general level of linkages among the points in a graph". As a consequence, network density scores identify how cohesive a network is: in a dense network, where network partners are closely connected to each other, collaboration should be easier. On the basis of these considerations, we measured network connectivity as the sum of three items ($\alpha=0.787$) that examine the extent to which network partners are interrelated and interact with each other.

3.2.3 Individual network leadership

Individual network leadership is the sum of four items ($\alpha=0.852$) concerning the tasks that the literature normally attributes to network leaders (Agranoff and McGuire 1999, 2001), such as forging agreement among partner organizations on the role and support of the network activities, forging agreement among network partners on the mission and vision of the network, leading partner organizations towards a common objective, and identifying partner organizations and leading them to participate in the collaboration. Respondents were invited to indicate who normally performs these tasks on a scale from 1 (=nobody) to 7 (=the network Director). This means that higher scores are to be associated with the presence of an individual network leader, and lower scores with the absence of such a leader.

3.3 Network performance

The conceptualization and measurement of network performance is one of the more controversial issues in the public network literature (Cristofoli and Maccio' 2018). Some authors conceptualize and measure network performance by looking at the network structure, process or output/outcomes; other authors focused on network performance from the partner organizations' point of view, the point of view of the entire network or that of the target community. In the same way, Cristofoli and Maccio' (2018), in their attempt to propose a multi-dimensional model of network performance, concluded that the ability of a network 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), network partners (as Provan et al.

said in 2005) and those participating in the networks (Cristofoli and Maccio' 2018). Following the cue from these studies, we propose a conceptualization of network performance in terms of the network's ability to achieve its objectives. Network performance was thus measured as the sum of three items (Cronbach alpha 0.747) related to the network's ability to support patients' autonomy, to induce patients' independence and to increase the clients' quality of life. All three items were formulated on the basis of the goals of the networks, as detailed in their designated public duties and established performance agreements. These documents state that patients should be treated as long as medically possible in their own household environment, in order to increase their autonomy and independence and keep them satisfied.

Once the study conditions and the outcomes were measured, they were calibrated, i.e. translated into fuzzy set values ranging from 0 (no membership) to 1 (full membership). Data calibration requires the definition of three different anchors: full membership (1), full non membership (0), and a cross-over point (0.5) reflecting the point of maximum ambiguity. After defining the set membership anchors, the specific software fs/QCA 2.5 (Ragin and Davey 2014) was used and the log-odds method was applied for the automatic calibration procedure. We used the fsQCA software 'calibrate' procedure to create the fuzzy set. The threshold values for full membership, full non-membership and the crossover point were set through the Tosmana (Cronqvist 2018) threshold setter, which proposes the thresholds on the basis of the data distribution (Cronqvist 2003). The specific values for each condition and the outcome variables are listed in Annex.

As both the conditions and the outcome are self-reported measures, common method bias (CMB) problems may arise. In order to control for CMB, we used both ex-ante procedural remedies for the survey design and ex-post statistical controls (Jarvis et al. 2003). Firstly, the survey was designed to prevent common method bias problems by using different scale labels and, hence, by defining different response settings. Secondly, the use of the Common Latent Factor method suggests that there is no significant CMB in the data, since the calculated variance is below the commonly accepted threshold.

4 Findings

We relied on the fs/QCA 2.5/3.0 software (Ragin 2006) to perform the QCA procedure.

The first step involves the construction and analysis of the Truth Table (Ragin 2000, 2006, 2008), listing all logically possible causal combinations (configurations) of the three conditions and assigning the empirical cases to one of those configurations.

A frequency threshold needs to be selected, corresponding to the minimum number of cases that must be observed for each configuration to be considered relevant for purposes of causal analysis of sufficiency. In the case of small-N studies, it is common to specify a minimum frequency of one case; for large-N studies, this number could be significantly higher. Here the lowest frequency identified by the procedure itself is 8, meaning that none among the logically possible configurations

features a number of cases lower than 8, therefore leading us to adopt 8 as the frequency threshold. A consistency cut-off also needs to be defined to code the outcome as present or absent and address the problem of contradictions. Consistency describes the proportion of cases belonging to any particular configuration that exhibits the expected outcome. We set the consistency cut-off at 0.972, well above the required cut-off of 0.75 (Schneider and Wagemann 2012) and corresponding to a drop in the consistency scores that is visible in our data (Vis, 2009).

This leaves us with six configurations for the analysis (Table 2). All the six configurations exhibit a very high (even if not perfect) consistency score. The PRI is also very high and close to the raw consistency. This should leave no room for the presence of cases that are inconsistent members of the outcome. Nevertheless, due to the high number of cases included in the analysis, we preferred to plot each truth table row against the outcome in order to see whether there are deviant cases consistency in kind (true logical contradictions). Only row 6 exhibits deviant cases consistency in kind (NTW21, NTW25, NTW106). When only one case belongs to the configuration, and this is a deviant case consistency in kind, normally the row is declared insufficient for the outcome, even if the consistency level would allow to include it in the analysis. This is because the consistency value is determined by a case that is not a member of the outcome. In our case, the decision is less clear-cut, as only 3 cases out of the 94 belonging to the configuration are true logical contradictions. This led us to return to our data and to the specific knowledge of the cases. The study of other data collected during the survey reveals that the three cases perform very well along two of the three items included in the performance measure. Moreover, other data about network performance gathered during the data collection process suggest that the three cases perform well. They fall out of the set of high performers because of a very low evaluation given to one of three items (compared to the evaluations of the other two items which is instead very high). As a consequence, we decided to maintain Truth Table row number 6 in the analysis. This leaves us with all six configurations included in the analysis (from row 1 to 6 in Table 2).

The fuzzy minimization process yields three possible solutions: (i) a ‘complex’ solution that avoids using any counterfactual cases (rows without cases, or logical remainders); (ii) a ‘parsimonious’ solution, which permits the use of any remainder that will yield simpler (or fewer) recipes; and (iii) an ‘intermediate solution’, which uses only the remainders that survive counterfactual analysis based on theoretical and substantive knowledge (which is input by the user). Ragin (2008) suggests that the best approach to interpreting the results is to view them on a continuum, where the complex solution is at one end, the parsimonious at the other end, and the intermediate solution somewhere in between the two. We chose the complex solution, expressed by the following ‘minimal formula’:

$$\text{AUT} + \sim \text{CONN} * \text{INDLEAD} + \text{CONN} * \sim \text{INDLEAD} \Rightarrow \text{HIGH PERFORMANCE}$$

where AUT stands for autonomization, CONN for connectivity and INDLEAD for individual leadership. The tilde sign (\sim) is used to indicate negation or absence of a condition, the logical operator ‘and’ is indicated by the * sign, and the operator ‘or’ is indicated by the + sign. The notation \Rightarrow denotes the logical implication operator.

Table 2 Truth table

	AUT	CONN	IND	LEAD	PRFM	n	Raw consist.	PRI consist.	Cases
r1	1	1	0	1	1	36	0.995774	0.99537	NTW3, NTW6, NTW7, NTW18, NTW19, NTW33, NTW40, NTW41, NTW42, NTW44, NTW46, NTW58, NTW67, NTW71, NTW76, NTW84, NTW100, NTW113, NTW122, NTW129, NTW130, NTW132, NTW138, NTW141, NTW144, NTW148, NTW156, NTW160, NTW166, NTW167, NTW179, NTW180, NTW181, NTW188, NTW189, NTW191 (Cons: 0.9958)
r2	1	0	1	1	1	24	0.990618	0.989351	NTW2, NTW4, NTW5, NTW8, NTW17, NTW38, NTW55, NTW75, NTW85, NTW90, NTW103, NTW109, NTW112, NTW114, NTW123, NTW137, NTW140, NTW157, NTW171, NTW182, NTW186, NTW193, NTW195, NTW199 (Cons: 0.9906)
r3	0	1	0	1	1	12	0.985535	0.983051	NTW35, NTW36, NTW45, NTW59, NTW65, NTW78, NTW105, NTW108, NTW125, NTW136, NTW150, NTW206 (Cons: 0.9855)
r4	1	0	0	1	1	9	0.978849	0.974856	NTW1, NTW16, NTW26, NTW48, NTW50, NTW57, NTW115, NTW165, NTW190 (Cons: 0.9788)
r5	0	0	1	1	1	8	0.977062	0.97137	NTW24, NTW49, NTW53, NTW54, NTW89, NTW128, NTW185, NTW202 (Cons: 0.9771)
r6	1	1	1	1	1	94	0.972248	0.970209	NTW9, NTW10, NTW11, NTW12, NTW13, NTW15, NTW21, NTW23, NTW25, NTW29, NTW30, NTW31, NTW37, NTW39, NTW47, NTW51, NTW52, NTW56, NTW63, NTW64, NTW66, NTW68, NTW69, NTW70, NTW72, NTW73, NTW74, NTW77, NTW79, NTW80, NTW81, NTW82, NTW83, NTW86, NTW91, NTW92, NTW93, NTW95, NTW96, NTW97, NTW98, NTW102, NTW104, NTW106, NTW107, NTW110, NTW111, NTW118, NTW124, NTW126, NTW127, NTW131, NTW133, NTW134, NTW135, NTW139, NTW142, NTW143, NTW145, NTW146, NTW147, NTW149, NTW151, NTW152, NTW153, NTW154, NTW155, NTW158, NTW159, NTW161, NTW162, NTW164, NTW173, NTW174, NTW175, NTW178, NTW183, NTW184, NTW187, NTW192, NTW194, NTW198, NTW200, NTW203, NTW208, NTW209, NTW211, NTW212, NTW213, NTW214, NTW215, NTW217, NTW218 (Cons: 0.9722)
r7	0	0	0	0	0	10	0.947931	0.933806	NTW22, NTW27, NTW34, NTW43, NTW87, NTW88, NTW116, NTW117, NTW176, NTW205 (Cons: 0.9479)

Table 2 (continued)

	AUT	CONN	IND	LEAD	PRFM	n	Raw consist.	PRI consist.	Cases
r8	0	1	1	0	0	25	0.946138	0.938305	NTW14, NTW20, NTW28, NTW32, NTW60, NTW61, NTW62, NTW94, NTW99, NTW101, NTW119, NTW120, NTW121, NTW163, NTW168, NTW169, NTW170, NTW177, NTW196, NTW197, NTW201, NTW204, NTW207, NTW210, NTW216 (Cons: 0,9461)

Frequency cut-off: 8; consistency cut-off: 0.97

In other words, three paths leading to the expected outcome are identified, featuring, respectively, autonomy from government, irrespective of the presence or absence of connectivity and individual leadership (path 1), the presence of individual network leadership combined with loosely connected networks, irrespective from the presence or absence of autonomization (path 2), the absence of individual network leadership combined with highly connected networks, irrespective of the presence or absence of autonomization (path 3) (see Table 3).

The presence of autonomization in the first path suggests that public networks such as those considered by this study are likely to perform better when governmental actors are not too actively involved.

The second path highlights the role of the network leader when members are loosely connected, i.e. connectivity is low. This is a reasonable response to a network's need to function in order to reach its objectives, and reflects the conclusion also reached by other studies (e.g. Jennings and Ewalt 1998; Provan and Milward 1995; Raab et al. 2015), which find that central organizations can play an important role when coordinating other organizations in order to overcome fragmentation and increase efficiency.

The third path shows that networks with high connectivity are likely to be successful without a network leader: this is consistent with the results of Wang's (2016) analysis of 22 governance networks in Beijing, who notes that "direct and decentralised interactions between organizations may help to improve the legitimacy of decision making and the effectiveness of implementing decisions" (Wang 2016, p. 385).

The overall solution coverage is 0.815636, meaning that the three paths explain about the 82% of all the empirical material that displays the presence of the outcome; the solution consistency is 0.972161, indicating that 97% of the networks displaying a partial membership in the solution are consistent members of the outcome. The intermediate and parsimonious solutions terms are identical to the complex solution term presented above.

Two additional measures allow to assess the fit of each configuration: raw consistency and raw coverage. Raw consistency displays the proportion of empirical data consistent with the outcome, whereas raw coverage assesses the proportion of instances of the outcome that exhibit a certain causal combination or path (Fiss 2007, 2011). A solution or path is informative when its consistency is above

Table 3 Overview of the configurations leading to (perceived) high network performance

	Path 1 AUT	Path 2 ~CONN*INDLEAD	Path 3 CONN*~INDLEAD
Raw coverage	0.728462	0.192475	0.327046
Unique coverage	0.364476	0.024969	0.059810
Consistency	0.973424	0.984504	0.990528

Solution coverage: 0.815636; solution consistency: 0.972161

Complex solution

Frequency cut-off: 8; consistency cut-off: 0.992

0.75–0.80, and its raw coverage is higher than 0.25, even if one path may have a low coverage, but a very high informative power. All our configurations exhibit a consistency score above 0.8, and a raw coverage close or above 0.20.

In order to complete the QCA, the analysis of necessity is also required. The aim is to ascertain whether any of the conditions are necessary for causing the outcome. This implies looking at the conditions' consistency scores, which measure the degree to which the cases support the following rule: the more cases that fail to meet this rule for necessary conditions, the lower will be the consistency score (Ragin 2006). As no condition meets the commonly accepted threshold of 0.9 (Schneider et al. 2010), none of the three conditions, in its presence or absence, can be considered as necessary for the presence of the outcome (see Table 4).

5 Discussion and conclusion

The aim of our study was to investigate which combinations of individual network leadership (the presence or not of an individual network leader), government autonomization, and network connectivity can lead to high network performance. As data were collected through a survey, the article builds on the self-perception of respondents, with the implication that we should be careful in generalizing results. In particular, self-reported data on performance has been proved to exhibit certain drawbacks (Meier and O'Toole 2013). In the following, we therefore explicitly use the term perceived network performance to discuss the results.

With these cautions in mind, the three paths identified by using fsQCA provide important insights from a theoretical, practical and policy point of view.

In theoretical terms, first, our study offers an important contribution to the growing literature on leadership in collaborative and network settings, by providing a more complex picture about the relationship between the leader, leadership and network structure. Specifically, neither the leader-centric nor the leadership-centric view of leadership can explain success alone. If network members are loosely connected and dispersed, an individual leader is warranted to implement those practices that allow people and/or organisations to come together and work effectively. If network members are highly connected, a network leader who implements network leadership practices seems not important, probably because such practices might be

Table 4 Overview of necessary conditions

Conditions tested	Presence of outcome variable	
	Consistency	Coverage
Autonomization	0.653093	0.690222
~Autonomization	0.551146	0.628639
Connectivity	0.633419	0.675668
~Connectivity	0.577836	0.652579
Individual leadership	0.649103	0.681644
~Individual leadership	0.569926	0.654578

The tilde sign (~) is used to indicate negation or absence of a condition

enacted through dense relationships and interactions that build a space to make leadership flow. In other words, as found in other studies on leadership in social movements (e.g. Sutherland et al. 2014), our (perceived) highly performing networks belonging to the third path seem to be leaderless networks, but we cannot say that they are also leadershipless as these dense relationships might produce leadership. This finding suggests the need for theories that foreground more the role of structure when explaining the role of leadership in network and collaborative settings, rather than merely focusing on agency, either individual or collective.

Secondly, following the previously described evolution of public leadership theories, our contribution enriches the growing strand which Ospina (2017) refers to as ‘collective leadership’. In fact, this literature moves the focus from the visible leader to the processes and practices that allow leadership to emerge. The term ‘collective’ here is by no means referring to a form of shared or distributed leadership among network partners, but rather refers to those instances where—as in the second path of our study—leadership may take place at the level of the system of ties, rather than at the level of the individual or of the dyadic relationship. By focusing on the structure and context where actors engage in network relationships, this work therefore gives insights to a constructivist perspective of relational leadership, which emphasises the role of the context where actors interact and in which leadership takes both place and shape (Uhl-Bien and Ospina 2012).

Thirdly, our results also contribute to fill a gap within the extant literature as they shed light on the relationship between certain structural and contextual features—autonomization and connectivity—and leadership in (perceived) highly performing networks. As in the case of Wright and Pandey’s (2010) work on intra-organizational environments, our results confirm that also within inter-organizational networks the relationship between structural characteristics and the emergence of leadership does not follow a consistent pattern. Networks may indeed be less flat than they are perceived, as our third path to success shows the presence of a network leader in combination with low connectivity. At the same time, the QCA procedure shows that networks may also reach success without such a leader, with ties among members that allow those leadership practices to take place. As for the role of autonomization, our results integrate those of Kort and Klijn (2011) who stress the importance of managerial autonomy from government for network success: we propose that such autonomy often plays a critical role, as it happens in the case of path 1, irrespective of the presence or absence of the other two conditions. Lastly, our results also contribute to the extant literature on the relationship between connectivity and leadership in networks (e.g. Balkundi and Harrison 2006; Balkundi and Kilduff 2006) by suggesting that high connectivity may promote the emergence of leadership even in absence of an identifiable leader.

From a practical point of view, our findings highlight the importance for public managers to design systems for connectivity within networks and collaborative settings as a fundamental property to achieve success in case of absence of a network leader.

From a policy viewpoint, our results provide an important hint: coherently with reform discourses both within New Public Management and New Public Governance advocating the fundamental need to ensure autonomy from government when

setting network and collaborative hybrid arrangements, autonomization alone may be enough to generate successful public service delivery in networks.

These results may be relevant to other networks or partnerships featuring both private and public partners involved in the provision of public services. As these types of networks have become ubiquitous and often critical for an effective and efficient response to citizens' needs (Koppenjan and Klijn 2004; Sørensen and Torfing 2011), our results and their further development will greatly benefit policymakers and public managers who are involved in the design and implementation of such networks.

The limitations of our findings relate, first, to the fact that they result from a specific setting given by the Swiss healthcare networks: future research should explore how they appear in other sectors and other countries. Also, other network features—such as age, centralization, or size—may combine in various ways with different shapes of leadership to produce high network performance. The complexities of using QCA with a relatively high number of conditions (Ragin 2008) limit the possibility to consider several conditions simultaneously; however, another selection of structural conditions—other than the one chosen within this study—may produce valuable insights and additional refinements to the existing literature. The paths obtained from our data should not be understood as design blueprints that are guaranteed to result in positive network outcomes, or designs for networks of healthcare provision that necessarily improve the wellbeing of patients. Further studies may wish to apply an fsQCA approach to better understand how the role of other structural or contextual conditions in combination with different types of leadership affects outcomes. Lastly, our work relies on the use of QCA in a large N-setting. Whereas this is increasingly common practice (Ragin and Fiss 2007; Raab et al. 2015), it should be noted that the large size of the sample does not allow the researcher to gain that level of in-depth knowledge and understanding of the individual cases that enriches QCA analysis in small N-settings (Rihoux and Lobe 2009). It is not our aim, in this study, to test hypotheses or give easy recipes. Rather, our aim is to shed light on the richness and complexities of situations that can be found in the real world. Moving from our results, future research may formulate and test hypotheses about the role and the shape of leadership in different network settings, thereby contributing to the progress of theory and practice in this particular field.

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Annex

See Table 5.

Table 5 Items, sources and calibration

<p>Autonomization (adapted from Kort and Klijn 2011) Cronbach alpha: 0.826</p>	<p><i>Please let us know to what extent the network has the power to make decisions on its own about ... (LOW POWER 1–HIGH POWER 7)</i></p> <ol style="list-style-type: none"> 1. The provision of homecare services 2. The definition of its own mission and vision 3. The definition of its own long and/or medium term programmes 4. The definition of its own objectives 5. The organization of inputs and tasks 6. the use of financial resources 	<p>1 (Full membership): 33.75 0.5 (Cross-overpoint): 25.5 0 (Full nonmembership): 17.25</p>
<p>Connectivity (new items based on Provan and Milward 1995; Provan and Kemis 2008) Cronbach alpha: 0.787</p>	<p><i>If you think at the network of organizations (e.g. Cantonal governments, municipalities, non-profit organizations) collaborating with your organization for the provision of healthcare services... 1 = totally disagree 7 = totally agree</i></p> <ol style="list-style-type: none"> 1. Network partners contact each other's to improve the provision of their services 2. Network partners collaborate with each other for the provision of homecare services 3. Some relationships exist among the network partners 	<p>1 (Full membership): 16.5 0.5 (Cross-overpoint): 12 0 (Full nonmembership): 7.5</p>
<p>Individual leadership (new items based on Agranoff and McGuire 1999; Agranoff and McGuire 2001; Kickert et al. 1997) Cronbach alpha: 0.852</p>	<p><i>Who NORMALLY performs the following activities, when they take place? (1. NOBODY. 4. THE INSTITUTIONAL BODIES. 7. THE NETWORK DIRECTOR)</i></p> <ol style="list-style-type: none"> 1. Forging agreements between partner organizations on the role and support of network activities 2. Forging agreements between partner organizations on the mission and vision of the network 3. Leading all partner organizations towards a common objective 4. Identifying the partner organizations and leading them to participate in the collaboration 	<p>1 (Full membership): 22 0.5 (Cross-overpoint): 16 0 (Full nonmembership): 10</p>

Table 5 (continued)

Network performance (new items based on Provan and Kenis 2008; Provan and Milward 2001) Cronbach alpha: 0.747	How do you rate the following statements on a scale of 1 (totally disagree) to 7 (totally agree)	1 (Full membership): 17.75 0.5 (Cross-overpoint): 14.5 0 (Full nonmembership): 11.25
	The collaboration allows to... ... to support patients' autonomy ... to induce patients' independence ... to increase the clients' quality of life	

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Daniela Cristofoli is Research Fellow at the University of Milano-Bicocca. Her main research interests involve network governance, network management, collaborative governance and public leadership. She is co-chair of the XIX EGPA Permanent Study Group on “Network policy and management.”

Benedetta Trivellato is Assistant Professor of Management at the University of Milano-Bicocca. She holds a Ph.D. in Information Society from the University of Milano-Bicocca, an MSc in Development Economics from the University of Oxford, UK, and a BSc. in Economics from Bocconi University, Milano. Her main research interests include: network governance; innovation in the public sector; design and management of public-private systems for services' provision; public leadership.

Alessandro Sancino is Director of Research on Citizenship & Governance and Senior Lecturer in Management at the Department of Public Leadership & Social Enterprise, Open University, UK. He is a member of the Executive Board of PUPOL (Public and Political Leadership Network) and of the Regional Studies Association Publications Committee. His research is focused on cities, democracy, government-citizens relations, public value and social innovation.

Laura Maccio', at the time of the research, was Post-Doc Fellow in Public Management at Università della Svizzera Italiana. Her research interests include managerial reforms in public sector, governance and network management.

Josip Markovic holds a PhD in Public Management from the Università della Svizzera Italiana. His main research interest is the effect of contextual, structural and managerial factors on public network performance.