Network governance forms in healthcare: Empirical evidence from two Italian cancer networks

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Abstract

Background: The study focuses on the application of a well known framework of networks governance modes to the specific field of healthcare public networks, extending the framework to the analysis of systems in which networks are involved. The aim of the study is to identify which contextual factors (internal and external to the networks) of different governance modes are critical for network effectiveness.

Methods: A qualitative study of two clinical networks belonging to the Italian healthcare system was conducted. The sample for interviews included representatives of the regional administration (n = 4), network coordinators (n = 6), and general and clinical directors of health organizations involved in the two networks (n = 25). Data were collected using semi-structured interviews.

Results: Our study confirms the general validity of Provan and Kenis' framework and shows how other specific factors and contingencies may affect the possibility of the two cancer networks finding positive equilibria between competing needs of inclusivity and efficiency, internal and external legitimacy, stability and flexibility. Concerning the first tension, our study shows the importance of distinguishing the professional inclusiveness of the organizational inclusiveness with respect to which of the two networks are characterized by different components. In both a critical role is played by a professional figure who acts as the network broker in managing the legitimacy tension, although the nature of the role actually played and the characteristics of individuals appear to be different. Few differences across networks are shown about the third tension in respect to which both networks are characterized by the network governance's stability although both were involved in two Italian regions that underwent healthcare system reconfiguration.

Conclusions: Our study shows the importance of considering three factors and contingencies that may affect network effectiveness: a) the importance of looking at the networks governance modes not in isolation, but in close relationship to the regional systems' governance; b) the influence of the specific network governance structure on the capability of the network to respond to tensions and achieve its goals; and c) the need to take into due account the role of professionals in network governance.

Introduction

Network-based modes of organization have emerged in many public services. In the healthcare sector, they are considered useful tools to define patients' care pathways and to help knowledge and practice sharing among organizations and professionals[1]. In the case of cancer services the reconfiguration to network organizational forms has become the rule rather than the exception[2].

Even though the first instances of networks were mainly voluntary groups of professionals, they have since been regulated, structured, and institutionalized by governing bodies to pursue central targets and concentrate healthcare services[1]. These networks, referred to as *mandated networks*[3], can be seen as a

completion of the institutional structure of a healthcare system, increasing its complexity by adding a horizontal dimension to the vertical hierarchy.

The governance structure is crucial for network functioning and it includes both formal and informal aspects. As pointed out by Iedema et al. (2017)[4], the governance of clinical networks has to be studied according to the dynamics and equilibria of healthcare systems. In fact, the creation of networks typically entails reconfiguring healthcare services to a network-based perspective while preserving the autonomy of the participant organizations. However, the reverse effect, i.e.,the effect of healthcare reconfigurations, such as merger processes, on networks, should also be taken into consideration.

Italian regional health systems are interesting cases for understanding and interpreting the position and role of clinical networks in changing healthcare systems. In fact, as every region has its own structure of healthcare system, different examples of clinical networks have emerged[5]. The geographical, demographic, political, and healthcare system context in which clinical networks developed, also influenced their evolution in terms of governance structure. Moreover, it is possible to explore the influence that healthcare organizations' reconfigurations, especially merger processes, have on pre-existing clinical networks.

Literature on network governance has provided indications of governance characteristics that are preferable in certain contexts or that fit better together, but has provided little empirical evidence[6–8]. The main aspect of this article is the application of the Provan and Kenis (2008) model[6] of the governance mode of networks to the specific field of healthcare networks and its extension to include the analysis of systems in which mandated networks are involved.

The aim of this study is thus to analyze and compare the governance of two cancer networks in two Italian regions that underwent system reconfiguration processes. Our research questions are: a) how Italian regional healthcare systems, which have recently gone through reorganization processes, such as merger processes, influenced governance structures for cancer networks; and b) which contextual factors (internal and external to the networks) affect the possibility that different modes of network find a positive balance between the competing needs identified by Provan and Kenis (2008)[6] (efficiency and inclusivity, internal and external legitimacy, flexibility and stability).

This paper is structured as follows. First, we review the literature on networks, with a focus on mandated networks and clinical networks. We then define the methodology of our study, followed by the description and comparison of our two cases based on a theoretical framework obtained from literature on mandated networks. We conclude by summarizing and discussing our key findings.

Literature

In the public organization domain, Provan and Kenis (2008) [6, p. 236]defined a network as "groups of three or more legally autonomous organizations that work together to achieve not only their own goals but also

collective goals." According to the authors, organizations join networks to gain legitimacy, enhance their effectiveness, attract resources, and address complex problems.

Collaboration may start from network members themselves *(voluntary networks)* but it can also be imposed by a third party, such as an institutional authority *(mandated networks)*[9]. In mandated networks this third mandating party, often referred as the regulator, has a key role in specifying the scope of the network, the financing framework and the distribution of resources and benefits, the eligibility or mandate to participate, the rules for relationships among members, the timing of actions, and the control mechanisms[10,11]. In highly institutionalized systems, such as public healthcare systems, voluntary networks frequently evolve into mandated networks through institutionalization[12] and these mandated networks often need to achieve commitment of and legitimacy from members to reach their goals. According to Rodríguez et al. (2007)[3], relationships among organizations in highly institutionalized systems are similar to relationships among business units within the same firm. This is true for Italian regional healthcare systems, where the regional authority can be considered as a single entity and the local health organizations (LHOs) as the business units[13].

Literature on networks developed many branches, among which are those on networks' structural characteristics, networks' formation processes[14] and network effectiveness or performance[15]. A different branch treats networks as mechanisms of coordination, often referred to as *network governance*[6]. In this article, we will refer to the latter branch of literature, focusing on mandated networks in the public healthcare sector. We will refer to the framework developed by Provan and Kenis (2008)[6], who identified three governance models:

a) the *shared organization model* where governance is accomplished informally (i.e., in the absence of hierarchy), through the uncoordinated efforts of stakeholders, or formally, through regular meetings of designated organizational representatives;

b) the *lead organization (LO) model* where one of the organizations of the network, chosen by members or mandated, assumes the responsibility for administration, receives resources from members, or intermediates the access to external funds. To set up such a model, one organization needs to have sufficient resources, legitimacy, and/or central position in the flow of clients/patients to play a lead role[6];

c) the *network administrative organization (NAO) model,* which occurs when a single individual (network facilitator or broker) or a formal organization consisting of an executive director, staff, and board including all or a subset of network members is set up for network governance and does not provide its own set of services. The administrative organization may be a government entity or a nonprofit organization.

These governance models, again according to Provan and Kenis (2008)[6], are permeate by three basic contradictory logics: inclusiveness vs efficiency, internal vs external legitimacy, and flexibility vs stability.

First, networks must reach a dynamic balance between efficiency and inclusiveness of members. Shared-governance systems, mostly relying on a clan governance mode to enhance coordination[16], i.e., on shared values, trust and reputation[3], may be enthusiastic and inclusive, but may lack efficiency, especially if members become numerous and are spread out geographically, or they may suffer from *collaborative inertia*[17]. To increase efficiency, networks tend to shift to lead organization models, where direct involvement––but consequently inclusiveness––are significantly reduced. An NAO could balance these tensions, as its board includes members of organizations in a set of formal rules and structure, but it may be seen as bureaucratic and less efficient and members may not feel accountable for network choices[18]. Moreover, ideally, network involvement should occur at several hierarchical levels in the organization, thereby gaining the participation, commitment, and engagement of all (*multiplexity)*[18]. In more complex governance models, such as NAO and lead organization models, interactions may only occur at higher hierarchical levels, reducing the commitment of the base. In NAO models, if all organizations participate to every decision, the network efficiency may suffer from *overembeddedness*[19].

A second tension between internal and external legitimacy needs to be accounted for.

Internal legitimacy is based on shared values and knowledge, trust, reputation, goal consensus[20]. This is the results of different dimensions:

a) The commitment of members to the network's goals; this can depend also on the competitive patterns among organizations and the potential benefits that members have from the interactions (i.e., for example, an organization may send patients to another network organization on the basis of its specialization);

b) The active role of a network broker. Some authors[21] noted that the abilities, management style, and leadership[22, 23] of the network manager, also called the facilitator or broker, are key factors in solving tensions, building and maintaining commitment (what Agranoff and McGuire (2001)[24] call mobilizing). To do this, in clinical networks, the broker needs to have robust legitimation from the professionals[25].

External legitimacy is the value of the network for external stakeholders, such as local or national government, or eminent public or private bodies.

Shared organization models, which seem suitable to address internal legitimacy even though clan mechanisms may result in divisions and distrust, are less easily recognized and legitimated by external stakeholders. On the contrary, the lead organizations in particular but also the NAOs appear more suited to represent networks externally as unique structures, but they may encounter further issues with internal legitimacy.

Third, a balance between flexibility and stability has to be found. Through networks, organizations can work with one another to achieve specific goals that require flexibility in order to share resources, knowledge, and expertise. Hierarchies alone could not readily accomplish such a degree of flexibility[26].

At the same time, however, high flexibility and adaptability, also typical of shared governance, are likely to be difficult to sustain in terms of legitimacy. Networks must then focus on stability––which can be intended both as stability over time, i.e., sustainability, and stability of mechanisms––to maintain legitimacy, for which the most obvious way is building a formal hierarchy, although this may end up destroying the original intent of the network, as well as alienating most participants. The regulator could actually over-formalize and constrain roles and relationships at the expense of flexibility[20]. Stability is also related to and influenced by goal consensus on long-term outcomes or process-oriented objectives[27] and by stakeholders' perceived effectiveness of the network.

Developing a governance structure requires frequent reassessment of the balance of the aforementioned tensions and how these are managed is critical for network performance[6]. The theme of how network governance relates to network performance is still under debate, in particular for networks in public and nonprofit contexts, even when limiting network performance to network effectiveness, defined as reaching network goals. The issue remains because network goals are often unclearly stated or non-uniformly perceived by the members of the network and because a large and mostly undefined number of network characteristics are involved in network effectiveness. However, perceived effectiveness by stakeholders (i.e.,regional authority and/or network members), to which we will refer in our study, can be used as a proxy for a minimum level of network effectiveness[7].

Methods

Research design

This study assessed different governance structures of two clinical networks in two Italian regions. This research is based on case studies, which are particularly appropriate for investigating healthcare systems complexity[28,29].

Case sampling

The sampling strategy was purposive[30]. We chose two cancer networks in Italy that had the following characteristics: a) they were mandated by the regional authority; b) their creation pursued similar goals; c) they were not too recent (i.e., at least three years old); d) they had recently undergone a reform of the system through a merger process.

Data collection

First, we collected national and regional regulations concerning clinical networks. A preliminary interview protocol was developed and adapted for LHO members (general director, clinical director, oncology departments directors, oncology unit directors) and regional healthcare offices directors, both chosen

according to the theoretical framework and our research questions. The protocol was partly refined after conducting the first interviews.

The interview protocol assessed these aspects: a) functions and main goals of the network; b) roles of stakeholders (professionals, LHO/UHO directions, regional authorities); c) roles of governance structures; d) control of resources; e) perception of effectiveness of the network; and f) changes in the network after healthcare system reorganization. Interviewed subjects are described in Table 1, according to the organization they belong to and their role.

Three researchers conducted the interviews from September 2018 to July 2019. Interviews, lasting 30–60 minutes, were recorded and transcribed for data analysis.

Data analysis

We used both inductive and deductive approaches. One of the authors coded the interview transcripts and exported quotations to a synoptic table from which researchers identified key emerging themes and concepts from the interviews. We integrated interviews with document analysis to improve the validity of our findings. Preliminary results for the first case were presented at a congress on clinical networks while preliminary results for the second case were discussed in a meeting of one of the main governance board of the network.

Analysis of Cases

The two regional healthcare systems and networks we studied are mainly public, both in terms of financing and provision of services. The public organizations are LHOs and university hospital organizations (UHOs). LHOs receive regional funding and provide both territorial (district) services and hospital healthcare services. UHOs are teaching hospitals and are financed using a DRG (Diagnosis Related Groups)-based system by LHOs. Both LHOs and UHOs, whose CEOs (general directors) are appointed by the regional authority, are internally organized into functional departments, according to disciplines (e.g., the oncology department), which are in turn divided into units according to structural location. Oncology department directors are appointed by the general director of each LHO/UHO. The basic structure of the healthcare systems is summarized in Figure 1.

[Insert Figure 1 about here]

In the last decade this basic architecture has gone through major institutional changes, among which a) the creation of intermediate bodies between the region and the LHOs, is mostly responsible for financial, managerial and/or epidemiological aspects, and b) there is a strong tendency to LHO enlargement and numerical reduction[31]. This process of merger and centralization has been accelerated by national laws defining minimum volumes of activities for healthcare structures and imposing centrally monitored

targets. Another important trend in Italian healthcare systems, recently enhanced by national laws, is the development and institutionalization of clinical networks, which are the focus of our paper.

LHO merger processes have been more intense in Tuscany, resulting in three LHOs with an average population of more than 1 million inhabitants, twice as much as in Veneto. Also, in terms of geographical extension, LHOs are almost four times bigger in Tuscany than in Veneto. Every LHO in Tuscany has a respective UHO on its territory, while only two LHOs in Veneto have a UHO. These and other differences between the regions are shown in Table 2.

In terms of the structure of providers, the network in Veneto has a multilevel *hub and spoke* structure, with a rather clear tendency to centralization of complex cases in hospital hubs (called *poles)* and, in cases of a higher level of care needs, to the two UHOs and to the Veneto Oncological Institute (VOI). The VOI is an oncological-only UHO that can be considered as the lead organization of the network. In Veneto, LHO merger processes did not reach such dimensions as to discard the traditional hierarchical structure of providers––LHO peripheral hospitals––LHO provincial hospitals––UHOs). Instead, the merger process made the LHOs less ambiguously connected to a certain hub.

[Insert Figure 2 about here]

The structure of the network in Tuscany, instead, has a less clear hierarchy of providers in terms of volumes of activity or leadership roles. In fact, extensive merger processes (from 12 to 3 LHOs) made the new LHOs bigger and more influential compared to UHOs, somehow dismantling the traditional hierarchy of providers and determining more complex patterns of centralization with no explicit reference to a *hub and spoke* model in the network statutory law.

In terms of governance structure, the two networks are characterized by the existence of an organization at the head of the network. However, considering governance models proposed by Provan and Kenis (2008)[6], the Veneto network is a form of lead organization network, although it shows some hybrid characteristics of an NAO model. The Tuscany network is instead an almost purely NAO model.

The network governance in Veneto is based on two levels: a lower level of coordination consisting of five *pole* commissions, each of which includes some LHOs and can include an UHO.

What is discussed by these commissions is then presented to and synthesized by the network coordinator, a clinician designated by the Regional Healthcare Authority, who then participates in the upper coordination level or oncological network coordination (ONC).

The ONC is a unique structure composed of the network coordinator and regional healthcare offices' directors. The ONC validates care pathways and specifies criteria to identify regional centers of reference for every type of cancer and for drug prescriptions, coordinates and monitors the activity and the organization of network nodes and network commissions, and coordinates clinical research. The ONC is supported by the scientific committee, composed of LHO and UHO representatives, general practitioners,

and patients' associations. The VOI may be seen as the lead organization of the network, according to the Provan and Kenis (2008) model[6]. In fact, four elements show a strong leading role of the VOI on the Veneto network:

a) the ONC physically occurs at the VOI;

b) the VOI is by far the biggest oncological provider in the network;

c) the VOI receives funding for the network-specific activities (e.g., clinical research coordination or network website development);

d) the network coordinator in charge––at least at the time of our research––is the director of an oncology unit at the VOI.

The fact that the ONC is formally independent from the VOI indicates an attempt to evolve to a hybrid NAO-LO form of network governance.

The network governance in Tuscany is based on a level of coordination that takes place in an institute (Institute for Oncologic Studies, Prevention and Networks, IOSPN) whose clinical activities are marginal (oncological screening for the city of Florence); thus it is mainly devoted to network coordination for which it receives regional funding. The coordination is achieved by three committees chaired by the IOSPN general director:

a) a strategic committee, in which regional office members and the general directors of all LHOs and UHOs participate; it is responsible for planning and monitoring network activities, through of a plurennial strategic document;

b) a technical committee, in which directors of oncology departments and regional offices members participate; they are responsible for supporting the strategic committee in the definition and implementation of activities planned by the strategic committee and expressing opinions on the plurennial document;

c) a scientific committee, whose members are designated partly by the strategic committee and partly by the IOSPN general director; they are responsible for supporting other committees and expressing opinions on the plurennial document.

Results

Results will be presented according to Provan and Kenis' (2008)[6] network contradictory logics.

Efficiency vs Inclusiveness

In the specific case of the health organizations, the inclusiveness has two dimensions: professional and institutional inclusiveness.

In Veneto, the presence of two coordination levels enhances *multiplexity* [18], ensuring a broader participation and commitment of all hierarchical levels of member organizations. The demands and proposals of professionals are discussed, both formally (in *pole* commissions or within the scientific committee) and informally (directly with the coordinator), and then gathered and summarized by the network coordinator who then brings the synthesis to the upper level of coordination (ONC) in which regional offices members participate. Therefore, a very important role is played by the coordinator of the network, the only professional representative in contact with the regional authority. About this a Regional Office director remarked: "*In taking decisions, I have the support of the coordinator who has already discussed the topic with network representatives*"..

The decision process is perceived as fluid by stakeholders: the professional inclusiveness is assured by the informal relationships among professionals and the coordinator helps in realizing an acceptable degree of institutional inclusiveness. As an Oncology department director noted: "*The coordinator is a sort of Prime Minister, supported by the Scientific Committee—who are the Ministers. The Prime Minister is not just an institutional role, he decides whether a choice is good or not. He has expertise and charisma. We need a leader, because you cannot just listen to everybody without a synthesis*"..

In Tuscany, all the cancer department directors are directly involved in the IOSPN Technical Committee while LHOs' general directors are directly involved in the IOSPN strategic committee. This basic feature of the Tuscan NAO model has not changed after the merger processes that extensively reduced the number of LHOs, even if the reform fully involved all the organizations in the network more easily. The new configuration makes it possible for the network to have just a single coordination level as most of the coordination efforts are now in charge of oncological departments. This reduction of coordination levels simplified the decision-making process, although the coordination between LHOs and the respective UHO remains difficult and perhaps has become even worse. Participation in the network committees is open to all member organizations and according to IOSPN Director this guarantees the inclusiveness as he said: *"Having only three large LHOs and an NAO makes the network easier to manage and gives to it more potentiality. With many LHOs the process was more chaotic".*

However broad inclusiveness may also have disadvantages in terms of decision-making process that risks to become too rigid and cumbersome as claimed by a respondent: *"Its weaknesses [network coordination committees] is that network participants may rely on the governance entity too heavily and it may adopt decision-making processes that seem overly bureaucratic."*. The same opinion is shared by a Clinical Director: "*There is no conflict between the network and health departments, but the network processes are too long*"..

Internal vs External Legitimacy

Internal legitimacy depends of the degree of competition among participating organizations and the role played by the facilitating mechanisms, such as the role of broker or the functioning of the representative system. In terms of network goals, respondents and official documents in both networks agree that the ultimate goal of the network is to guarantee equity of access and quality, security, and effectiveness of cancer care to all citizens. These goals are similar in the two cases and can be grouped in three areas: a) standardization of competencies and approaches, b) criteria for resources allocation, and c) definition of strategic priorities.

However, the two networks show a different pattern of *competition among organizations* that influence the relationships among members and affects their commitment to network. In Veneto, the formalization of the hub and spoke structure is more clearly designed. The result is a more hierarchical regional model, which requires a high degree of consensus by both professionals and organization directions to work. Most of the competition in the network is played out among UHOs to attract patients from regional and extra-regional LHOs both for economics and prestige. The involvement of spokes in the network, to not be just "patient-senders," should be guaranteed by their participation in the decision-making process and by the possibility of becoming regional reference centers for specific pathology and procedures. One LHO General Director explained: *"Now spokes feel free to send patients to hubs without feeling belittled, whereas they felt it as a 'patient leak' even if they might have treated them inappropriately.* The same hierarchical structure applies to the field of clinical research. In this case the VOI has the mandate to coordinate clinical research and keep databases of studies being conducted in the region. This role of the VOI is favorably considered by network members as underlined by an LHO oncology unit director: *"Wise centralization added real value, especially because the resources were scarce".*

In Tuscany, a more homogeneous distribution of market power among participant organizations increases the degrees of competition as a network coordinator affirmed: *"After merger larger LHOs started competing with UHOs.* The increase of level of competition made more difficult to exploit the potential synergies in the system. "*Before the merger, groups of smaller LHOs and their respective UHOs had regular meetings, which are now occurring more sporadically…we were more accustomed to work together as professionals… to hold scientific or clinical meetings, we used to have a research coordination office which is no longer there"* as affirmed a technical committee member and LHO oncology unit director.

Most of the competition is perceived to operate between an LHO and its respective UHO, and a reduced LHO-UHO coordination capacity is seen as a drawback of merger processes, as noted by a LHO oncology unit director: *"There's still this misunderstanding that only UHOs should do high-level activities in particular in the field of hospital care. In Tuscany this is no longer the case, since we have LHOs that can compare with UHOs in terms of competencies. This can create conflicts between LHOs and UHOs".* However the network coordination committees, where LHO and UHO department directors and general directors regularly meet, are considered the right places where these kinds of conflict can be resolved, as two different respondents declared. In particular an UHO clinical director noted: *"We had LHO-UHO formal contacts before mergers on many topics. Now I perceive wider divergences between LHOs and UHOs, but*

they may well be overcome by the coordination efforts of the network". An LHO oncology department director said: *"LHOs now have a peer-to-peer dialogue with UHOs, and we perceive some relationship difficulties, for example on the issue of breast cancer units. These conflicts should be resolved in the network committees".*

The second aspect of internal legitimacy refers to the *broker and network committee's roles.* In both regions, the attitude, leadership, and clinical authority of the coordinator in office are recognized as important elements of the network.

In Veneto, the broker is highly legitimated and perceived as "belonging" to the professional rather than to the regional/political component (the coordinator of the network is an oncology unit director). As noted by an LHO oncology unit director: *"The coordinator is assertive, engaging, he has given us stimuli to change our mentality".* Also at regional level the important role played by the broker is recognized: *"The strong leadership of the coordinator on clinicians played a crucial role since it offered a solid ground for clinically-based decisions and helped in the implementation processes" (*a RegionalHealthcare Office member*).*

On the other hand, some internal legitimacy issues emerge because of the central role of the VOI; some participants have seen the network as a means for the VOI to pursue its own goals.

Instead in Tuscany, the broker and the IOSPN are perceived by professionals as regional components of the network.

External legitimacy refers, instead, to how the network is perceived by external stakeholders, e.g., funders, regulators, the public, the media. We will mainly refer to the perception of funders-regulators, which mainly coincides with the regional authority in the analyzed networks.

In Veneto, the leading role of the VOI is important because it physically represents the network center, patients, and non-oncologist professionals. It represents a useful tool for regional authorities, providing an unique interface as also declared by a regional member: "*Thanks to the presence of the network when I talk with the coordinator, I know that he has already informally collected the opinion of all the members.*

The ONC is a system wherein technical instances of professionals are presented and discussed with the regional authority by the coordinator of the network. Yet the final decision still occurs at the regional level as noted by a representative of the regional authority: "*If the proposal coming from the network through the coordinator is not convincing, we decide differently".*

In Tuscany, not only the network administrative organization (IOSPN) is legitimated by the regional authority, but it appears as part of the regional authority and decisions are taken in its committees.

Also the broker of network recognizes his role as a liason between participant organizations and the region, as he himself states: "Unlike what happens in other networks, in Tuscany there is a strong need for a liason figure with the regional government and administration. I have a mandate from the regional

government …. In other regions the network is more horizontal, in Tuscany the network has a professional base but it is strongly institutionalized".

Flexibility vs Stability

For public healthcare networks, changes in the environment, and the consequent need for flexibility, may have different sources. Considering their impact and frequency, system reforms are among the most important. In this case, it is the regional administration that, through a top-down decision, changes the relevant environment in which the network operates and potentially asks for changes in the functioning and governance of the network itself.

The processes of institutional change (mainly the reduction in the number of LHOs) that affected both the systems had different levels of intensity and progressiveness. The reform in Veneto was less radical and more gradual compared to what happened in Tuscany where, through an institutional shock, the system was completely revised. Consequently, the need for changes in the two networks was different. Although at different levels, both would have required a "reassessment of structural mechanisms and procedures in light of new developments, and a willingness to make needed changes"[6, p. 245]. Instead, both systems introduced only marginal adjustments involving more behavioral aspects than formal procedures and rules.

Another important element impacting the tradeoff between flexibility and stability concerns the level of formalization of the system. In general, more formalized systems require a greater level of formal change in governance mode. Tuscany, whose network is older, has gradually strengthened the formal structure of the network to improve its sustainability. This can been seen both as a sign of network maturity, but also of network evolution towards more hierarchical structures. Owing to its greater degree of formalization, the system would have been in greater need of change in its components. The system instead replicated the same governance structure despite major changes introduced by the reform: the size of the organizations' network members was greatly increased and, as a result, their weight increased noticeably thereby changing the balance of the power in the network. This is well recognized by a Oncology Department Director: *"With the mergers that have created much larger organizations, the network lost strength, it should be rethought in its functions and mission and the structures and mechanisms governance should be redesigned".*

Discussion

The analysis of the two cases provides insight on the functioning of public mandated health networks. We focused on cancer networks because, among other reasons, they are good examples of very complex networks playing a critical role in the functioning of public healthcare systems.

Analyzing modes of network governance, Provan and Kenis (2008)[6] proposed three different forms or modes. While there is not such a thing as a single best form, each one is likely to ensure different degrees

of effectiveness in relation to certain critical contingency components. More importantly here, each form exhibits distinctive advantages and disadvantages in managing three typical tensions that inevitably arise in network functioning. Our study confirms the general validity of the Provan and Kenis framework and shows how other specific factors and contingencies may affect the possibility for the two cancer networks to find positive equilibria between competing needs.

Efficiency and inclusiveness

Inclusive decision-making is a condition for building trust and promote collaboration among participants, but it is time-consuming and can menace the administrative efficiency in network governance. The institutional framework characterizing lead organization models responds better to efficiency needs, while it opens potential gaps along the inclusiveness dimensions.

The Veneto case shows two different ways of coping with such gaps. As far as “professional inclusiveness” is concerned, the average dimension of the participant organizations and their mutual dependency facilitate the informal interactions among professionals of different organizations. The network coordinator participates in this intense dialogue and, given his formal role, easily brings concerns and critical issues coming from professionals to the decision-making level. In the case of mandated networks working in structured health care systems, “organizational inclusiveness,” should be considered in a wider institutional perspective. LHOs, UHOs, and the VOI itself are all public organizations whose owner is the regional government that governs the system as a whole through the regional administration. The governance form of the network is thus part of a wider governance structure of the regional healthcare system that, in turn, exhibits its own equilibrium between efficiency and inclusiveness. In Veneto where the formal inclusiveness is lower, but the level of trust and collaboration among public organizations and thus the informal inclusiveness is very high, the cohesiveness of the overall system removes some of the pressure for inclusiveness inside the network.

The NAO is a compromise form embodying structured and representative participation in a focused administrative machine; not surprisingly, the IOSPN, as an NAO, must face problems different from those experienced by a lead organization like the VOI. On the professional dimension, the representative structure of IOSPN may well try to assure the involvement of professionals as individuals, but may experience significant difficulties with genuine networks. In fact the dimension of LHOs and the persistence of dynamics linked to the previous LHOs, make the Tuscany network a “network of LHO’s networks” in which “the functioning of each of the internal networks directly influences the efficiency and efficacy of the external network”[32]. In this perspective the interactions between internal networks and the external regional network are relevant, but they hardly can be governed through formal representative mechanisms and what actually happens inside each organization remains a problem for the IOSPN. From the organizational point of view, the limited number of participants, the scarcity of their operative interactions and the prevalence of dyadic relationships (LHOs and UHOs in the same area) push the IOSPN toward a role of global planning and regulation in which it is not easily distinguishable from the

regional administration with its routine administrative burdens. Certainly, the focused mission, the technical capabilities and the structured participation of the participant organizations to the decision-making are unique characteristics and specific advantages of the NAO form. In any case such differential advantages over a classical form of coordination through the regional administration must be compared to the costs of the necessary coordination between the NAO and the regional government itself. In the Tuscany case such costs are negligible, given, on the one hand, a long story of personal and institutional cooperation between IOSPN and the region, and on the other, the strength and stability of the political leadership.

Internal and external legitimacy

In both cases a critical role in managing the legitimacy tension is played by a professional figure who acts as the broker of the network. Yet the nature of the role actually played and the characteristics of individuals appear to be different.

The lead organization form is especially equipped to respond to the challenges of external legitimacy, exploiting an intrinsic legitimacy of the lead organization that extends its effects to the network as a whole[6]. In Veneto the external legitimacy of the lead organization (VOI) is visibly reinforced by the role of the network coordinator. He is a well-known clinical leader with a remarkable personal legitimacy, extending from the professional (internal) to the institutional (external) sphere[23]. In this case, not only there is no tension between the two sides, but they reinforce each other: the internal legitimacy is a fundamental basis for external legitimacy and, at the same time, the possibility and ability to negotiate for the network with the external stakeholders, the region *in primis,* make the role more legitimate and stronger. The equilibrium in the network between the two competing needs is thus reached by the joint contribution of the governance mode (the presence of a lead organization) and the action of a professional leader playing a formal as well a substantial role. From this point of view the governance structure of the lead organization itself becomes part of a more general governance mode of the network, which in turn is part of the governance of the regional healthcare system. In fact, the VOI has a general director and a scientific director, but the network coordinator is the director of an important department and plays a substantial role in the actual governance of the institute. In this way, needs and point of views of the network can have a strong representation in the choices of the lead organization.

The NAO should represent a form able to reach a balance between internal and external legitimacy needs. Yet the IOSPN case shows that even when the governance structure is potentially more able than others to absorb competing tensions, the importance of a broker coming from the professional environment cannot be undervalued. This is especially true in a situation in which competitive pressures may be particularly strong (UHOs and LHOs insisting on the same catchment area) and the dimension of participant organizations risks making the representative structure of NAO too distant from the actual dynamics of front-line professionals.

Moreover, large organizations, being more self-sufficient, may have fewer incentives to cooperate and they enjoy a stronger external legitimation as single organizations, thus the centralized administration of the NAO may not be sufficient to represent the network externally.

In this complex situation governing and managing the IOSPN “machine” is not enough: in the capacity of successfully keeping together diverging exigencies, a crucial role has been played by the personal legitimacy of the IOSPN general director. He comes from the professional field and is still recognized by his former colleagues. At the same time, he is very familiar with it and well known to the administrative, political and institutional environment of the region. Even in the Tuscany case, the network’s actual functioning and its outcomes are thus the results of the governance form and of the action of a credible leader capable of representing the network at different level, acting on different dimensions.

Flexibility and Stability

A last tension that networks have to face is a tradeoff between the need for flexibility and the need for stability. Here NAO and lead organization forms even if different, are both positioned on the “stability” end of the spectrum. This is especially true for mandated networks operating inside public health care systems, where such networks are part of the institutional framework linking regional government with public organizations. In Veneto and Tuscany, in fact, VOI and IOSPN play a definite role in regional governance. Both have the mission to increase levels of collaboration among organizations already coordinated through institutional hierarchy. In being part of the institutional framework, mandated networks, such as those described here, should follow the same dynamics of re-adjustment to the system to which they pertain. In line with the original characteristics of networks, as opposed to those of hierarchies and institutions, we could have expected that mandated networks would be among the most dynamic components of the institutional framework of regional systems. Yet, quite paradoxically, IOSPN and VOI did not significantly change their role and their governance structure even on the occasion of what can be considered a major change in both healthcare systems, namely, reduction in the number of entities to be coordinated.

The persistence (stability) of governance forms may have different sources and explanations. Looking at the Veneto and Tuscany experiences, we propose three different, complementary not alternative, interpretive perspectives.

The first refers to the role of political rationality and its limitations in the process of change of political-institutional systems. In both cases we analyzed the reduction in the number of public institutions has been more the result of external (political) pressures, the need to change something, than of internal (functional) exigencies of the systems. This has probably focused the attention on the more visible and structural part of the systems, leaving aside networks perceived as mechanisms to be adjusted rather than structures to be formally modified.

The second perspective considers the importance of the formal structure of VOI and IOSPN in relation to their actual role in the network's functioning. Flexibility and adjustments may well occur even within an unmodified set of formal rules (the network governance forms) considering that a relevant component of the coordinating function rests on the capacity to exert influence outside a hierarchical framework. This means that perceptions, behaviors, and individuals are more important than formal rules.

The third perspective looks at mandated networks as a part of a regional governance structure aimed at governing and controlling public entities in charge of providing services to the population. In terms of system governance needs, the reduction in the number of LHOs has not been perceived as a major change in the nature of the system and has not triggered any actual reassessment and modification of the governance structures and mechanisms.

Conclusions

Using the framework proposed by Provan and Kenis (2008)[6] we analyzed the case of two regional cancer networks in the context of the Italian National Healthcare System. The selected networks share two characteristics that make them interesting and that must be considered when interpreting the results. The first is their institutional collocation. Even if they involve organizations that enjoy large degrees of autonomy, they are part of a unitary public system that imposes on them and uses them as a component of a definite regional governance architecture. The second feature is the professional nature of activities to be coordinated that influences in many respects the ways in which individuals and organizations can be oriented. In comparison with previous studies considering "generic" networks, our analysis allows specific traits of this kind of network to emerge, opening up fresh perspectives for future studies.

The collocation of the objects of analysis in a wider institutional framework suggests the need to look at the networks' governance modes not in isolation, but in a tight relationship with the regional systems governance. In this perspective, some of the "classic tensions" may be alleviated by the characteristics of the regional governance, as in the case of the legitimacy or the inclusiveness offered to the network by the governance structure of the system as a whole. At the same time, new tensions may arise. A good example is the potential tension between a top-down role of the network as a tool of the regional administration pursuing regional objectives and its bottom-up role of representing the needs and priorities of participant organizations. Even in this case, different governance modes of the network may exhibit different advantages and disadvantages.

Our study shows also the role that another component of the general institutional environment can play in assuring the functionality of networks. Both NAO and lead organization modes work around a structured organization that has its specific governance structure. As it defines how different interests are represented in the decision-making processes and overall functioning of the central organization of the network, such a structure may exert some influences on the capability of the network to respond to tension and achieve its goals. In synthesis, a promising perspective for future studies seems to be to link

the governance mode analysis with the regional governance framework, from the one hand, and the governance structure of the specific network's central organization.

The role that professionals play and the power that they can exert in the functioning of health care systems and organizations are well-known issues in the managerial literature. From the specific perspective of networks a significant attention of the literature has been devoted to clinical networks and professionals behavior. Our research confirmed the importance to keep into due account the role of professional, distinguishing in the analysis the professionals from the organizational side. In the health care context, networks are complex mechanisms in which the coordination of organizations in themselves cannot guarantee a coherent alignment of individuals behavior. Formal arrangements and procedures, typical of structured governance modes, cope better with organizations, but they must be complemented with adequate informal mechanisms and other conditions if they want to influence professionals. The cases we analyzed highlighted the critical role of brokers with strong professional background and legitimacy in keeping together the professional with the organizational dimension of the network functioning. Future research could explore better the conditions for a positive coexistence of formal and informal mechanisms and the individual characteristics of the broker.

List Of Abbreviations

CEO = Chief Executive Officer

DRG = Diagnosis-Related Groups

IOSPN = Institute for Oncologic Studies, Prevention and Networks

LHO = Local Health Organization

LO = Lead Organization

NAO = Network Administrative Organization

ONC = Oncological Network Coordination

SC = Scientific Committee

STC = Strategic committee

TC = Technical Committee

UHO = University Hospital Organization

VOI = Veneto Oncological Institute

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

Data used in this manuscript are from recorded and transcribed interviews. It is not possible to share these research data publicly, since individual privacy could be compromised. The datasets are available from the corresponding author on reasonable request and with permission of interviewees.

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All authors participated to interviews. The authors share the final responsibility for this paper. MDV wrote the paragraphs "Discussion" and "Conclusions", AR wrote the section "Literature" in paragraph "Background" and the paragraph "Results", GS wrote the section "Introduction" in paragraph "Background" and paragraph "Methods".

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Tables

Table 1: Interviewed subjects, according to their organization and their role

Organization	Role	Veneto	Tuscany
Region	*Regional Healthcare Offices Director*	3	1
Network coordination structures	*ONC/IOSPN* member*	1**	5
LHO	*General Director*	6	3
	Clinical Director	4	1
	Oncology Department Director	2	3
	Oncology Unit Director	4	3
Total number of interviews		20	16

**ONC = Oncologic Network Coordination; IOSPN = Institute for Oncologic Studies, Prevention and Networks; ** Other ONC members are regional healthcare offices directors and thus listed above*

Table 2: Regional population and healthcare system characteristics (2018)

	Veneto	Tuscany
Population	4,903,722	3,736,968
Area (km^2)	18,345	22,987
Population Density (inhabitants/km^2)	267	163
Number of LHOs (after merger)	9	3
Number of LHOs (before merger)	21	12
Extent of LHO number reduction after merger	-57%	-75%
Number of UHOs (after merger)	3*	4**
Average LHO population (after merger)	544,858	1,245,656
Average LHO area (km^2) (after merger)	2,038	7,662

** A UHO is specific for cancer care (Veneto Oncological Institute, VOI)*

*** A UHO is specific for pediatric care*

Table 3: Differences between the networks in terms of structure and governance

	Veneto	Tuscany
Providers structure	Multilevel (*hub and spoke)*	Horizontal
Governance model	Lead Organization	Network Administrative Organization
Coordination levels	2	1
Higher-level coordination committees	2*	3**
Lower-level coordination committees	5***	-
Year of network implementation	2014	2001

* ONC = Oncologic Network Coordination and Scientific Committee; **Strategic Committee, Technical Committee and Scientific Committee; *** Pole Commissions

Figures

Figure 1

Basic structure of the Regional Healthcare systems. Acronyms - LHO: Local Health Organization; UHO: University Hospital Organization; Dep: Functional Department (e.g., Oncological Department); District: part of the LHO responsible for territorial (extra-hospital) services; U: Clinical Unit

Figure 2

Veneto (left) and Tuscany (right) network structure. VOI = Veneto Oncological Institute; ONC = Oncological Network Coordination; SC = Scientific Committee; LHO = Local Health Organization; UHO = University Hospital Organization; IOSPN = Institute for Oncologic Studies, Prevention and Networks; TC = Technical Committee; STC = strategic committee.