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THE CONTROL OF PUBLIC NETWORKS

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ABSTRACT: *This paper examines the control of networks, an issue that we believe is critical for explaining the overall effectiveness of public networks. We first discuss why it is important to study the issue and why it has been neglected as a topic by public management and organization scholars. We then present the various types of control and how they are utilized in a network context. Finally, we discuss how the mechanisms of control might be related to network effectiveness, drawing heavily on an understanding of how this relationship is addressed by contingency theorists. We close by posing challenges to researchers for developing new insights into the control of networks and why this knowledge is relevant for public managers and policy makers.*

“When you ask a manager what the three most important things about a joint venture are, he or she will likely answer, ‘control, control, control’.” (Geringer and Hebert 1989)

Networks have become extremely important as ways in which organizations accomplish their goals. Networks, consisting of two or more organizations that consciously agree to coordinate and collaborate with one another, are used to deliver services, address problems and opportunities, transmit information, innovate and acquire needed resources. Consistent with the importance of networks to organizations in business, public and nonprofit sectors, the study of networks has exploded in recent years (see e.g., Bradach and Eccles 1989; Powell 1990; Smith-Doerr and Powell 2005).

Despite this interest, there has been very little work addressing the concept of control of networks. To some extent, this absence is understandable but at the same time undesirable. Control has traditionally been studied in an organizational context, focusing primarily on structural mechanisms including rules, hierarchy, and governing boards (Mintzberg 1979; Fama and Jensen 1998); personal control through leadership; and external constraints (Pfeffer and Salancik 1978). Networks are, by design, built around collaboration, and the idea of formal control mechanisms is typically viewed as inconsistent with the whole point of having a network. Not addressing the issue of network control is undesirable since some form of control, whether formal or informal/norm-based, is necessary to coordinate network activities and to ensure that network-level goals, and not just organization-level goals, are achieved.

We define the control of networks as the use of mechanisms by actors to monitor the actions and activities of organizational networks to enhance the likelihood that network-level goals can be attained. Although networks have been studied in all sectors, we focus here on the control of networks that produce public goods. Thus, we are interested in what Mayntz calls “system effectiveness,” or the conditions under which networks can provide “a possible solution to coordination problems typical of modern societies” (Mayntz 1993, 13). This broad focus has also been referred to by Provan and Milward (2001) as the “community level effectiveness” of networks, which they view as critical in public and nonprofit sector contexts.

The concept of control used here comes closest to how it is used in the organization literature¹ and is broadly defined. It contains different forms of control such as formal control, informal control, accountability, responsibility, market control, popular control, licensing, accreditation, stewardship, representative control, clan control, etc. The concept of control employed here is thus not limited by the “mechanisms” or “means” of control but rather by its “goal” (i.e. monitoring in order to redirect actions). In the same way that organizational control is typically viewed as one specific dimension of management, we consider the control of networks to be a dimension of the broader concept of network governance.²

To structure our discussion, several issues will be addressed. First, why should we study the control of networks? Second, why has control of networks rarely been studied? Third, what types of network control can be distinguished? And fourth, to what extent is the control of networks related to network effectiveness?

WHY STUDY THE CONTROL OF NETWORKS?

An important reason for studying the control of networks is because networks have become such a significant form of governance. Many now contend that effective programs require complex, collaborative partnerships among diverse government, nonprofit, and business actors at the international, state, and local levels (for an overview, see van Kersbergen and van Waarden 2001).

In the study of any prominent type of governance, whether market, hierarchy, or network (Powell 1990), the issue of control figures as an important topic. As Hood points out: “After all, who is to control whom and how, is always the

central issue . . .” (2002, 310). Despite its importance, however, researchers have paid very little attention to this topic (in a subsequent section we will speculate on the reasons why this might be the case). Thus, we know very little about how networks are controlled. Also, the study of control of networks is important from a normative point of view. If we believe that networks should produce public goods rather than focusing more narrowly on organizational or client goals, and if networks should not be disruptive or produce negative externalities, then studying control mechanisms is important.

The control of networks seems especially important for understanding poorly performing networks or networks that may have a negative impact on society. Despite the euphoric description of networks in most of the literature on the topic, networks often fail to achieve their intended goals, the costs of network disruption are often substantial, and they can even be harmful to the public at large. Examples of such cases include interfirm networks (see Park and Russo 1996), “dark networks” (e.g. the Al Qaeda network; see Raab and Milward 2003), malfunctioning policy networks (e.g. the health care system in the Netherlands, see Kenis 2006b), malfunctioning private-public partnerships, etc.

From a practical point of view, the study of the control of networks is also important. In particular, for both government policy makers and funders (both government and foundations) it is imperative to understand better why networks succeed or fail and what the impact of control is for overall network performance. From the organizational literature we have learned that, in general, there is a relationship between control and performance. The direction of this relationship is often not apparent, however. For instance, tighter control may lead to positive network-level outcomes in some cases, but to weaker performance in others. Thus, a question of significant practical relevance is how the mechanisms and processes of controlling networks should be designed in order to have a positive effect on network performance and a negative effect on disruptive externalities.

A final reason why it is important to examine the control of networks is because we cannot easily transfer our knowledge of organizational control to the study of networks. Networks are unique entities, “neither markets nor hierarchies” (Powell 1990), that need to be studied in their own right. Networks are multi-organizational forms, but control is extremely problematic. Each participant can be expected to be loyal to the needs and goals of their employing organization, and each organization in the network will have its own control mechanisms in place, which are likely to be inconsistent with those of the network as a whole. In particular, as Agranoff and McGuire (2001, 309) correctly point out, accountability is unique, being diffused across network members making control exceptionally complex.

WHY HAS THE CONTROL OF NETWORKS BEEN NEGLECTED?

A computer search made by the lead author in his university’s journal article database (1,200,000 records) produced 129 hits when searching for “network and

control.” Only 9 of those 129 articles were, however, related to social sciences. The other 120 articles were related to technology. A typical article in this field was titled “Internet Performance and Control of Network Systems.” Are we leaving the issue of control to the engineers? Will the future be a network-technology-controlled world with some post-modernist social scientists at its fringes?

Although the topic of control of networks is very underdeveloped in the literature on networks and network governance, there are some notable exceptions of research that have at least touched on the topic. This work includes Zald’s article “On the Social Control of Industries” (1978),³ Lammers’ study on the interorganizational control of an occupied country (1988), Wondoleck and Yaffee’s study of natural resource development (2000), Selznick’s study on TVA and the Grass Roots (1949), Provan and Milward’s study on mental health systems (1995), Park’s framework of the institutional mechanisms for interfirm network control (1996), and some of the literature on multi-national corporations, which increasingly considers these corporations as loosely coupled network organizations (e.g., Goshal and Bartlett 1990; Harzing 1999).

How can the peculiar absence of this topic in the literature be explained? There appear to be two main reasons for this absence, each of which we discuss below. The first likely reason is that because networks are typically conceived of as non-hierarchical and governed through collaboration, control is thought to be contradictory to the basic network form. One would most obviously expect the topic of control to be addressed in the literature on the management of networks. This seems likely because, in the traditional literature on organizations, control is seen as one of the principal functions of management. However, the link between control in networks and control in organizations is seldom made.

For instance, in one well-known book on the management of networks (Kickert, Klijn and Koppenjan 1999) the word “control” does not appear once in the subject index. How can this be explained? A key reason seems to be that in the literature on network governance, networks are presented as a *solution* to the problem of control. The assumption seems to be that “good management” (i.e., leading to satisfaction of the network participants, win-win situations, and some process criteria) is a substitute for control. In other words, network governance and network management are seen as modern (or even postmodern) forms of self-regulated control. Talking about control would, from such a perspective, probably only harm the functionality of the network.

Contrary to this position, we view control as an essential aspect of networks that need not be hierarchical. In this regard, it is important to differentiate between two meanings of the term “network” in the context of control. First, we should consider “network” as a possible mechanism of control in its own right (what we refer to as “reputational control” in what follows). Second, we consider a network as a coordination form and, thus, as an *object* of control. There is no one-to-one correspondence between networks as a mechanism of control and as an object of control. In the same way that organizations can be controlled through formalized mechanisms like rules and hierarchy, so too can networks, although the mechanisms of control may differ, including culture and the relationship itself.

The implicit assumption often made regarding networks as the object of control is that a network is logically controlled by another network. However, this logic is often not correct. Take, for example, the Al Qaeda network, which presumably has a network form of coordination consisting of both individuals and organizations. As we discuss in the next section of the paper, Al Qaeda, at least as it was structured prior to September 11, 2001, can be considered as a network that is not characterized by control mechanisms that are inherent to the internal relational structure of the network itself. Rather, it is centrally controlled; more specifically, through personal centralized control. To state that "it takes a network to fight a network"⁴ (Ronfeldt and Arquilla 2001) might seem, at first glance, obvious. However, this logic assumes a one-to-one correspondence between the method of control and the coordination form.⁵

Those who have studied networks seem to have been carried away by the idea of networks as self-regulated, horizontal forms of coordination (cf. Kenis and Schneider 1991). They have generally lost sight of the existence of more traditional power and control mechanisms that can complement self-regulation and norms of trust. A similar observation can be made regarding the literature on public administration, especially when related to topics such as reinventing government public-service reforms, new public management, and the like. As James Q. Wilson (1994) notes, "[t]he near absence of any reference to democratic accountability is perhaps the most striking feature of the Gore [reinventing government] report" (668). The above tendencies could also be explained by what Renate Mayntz (2001) observed as the "problem solving bias in the governance literature."

The second possible reason why the control of networks is seldom discussed is because networks are generally seen as uncontrollable. As Agranoff and McGuire (2001) point out, it is "difficult to establish accountability in public management networks." While accountability is always a thorny issue, in the case of networks, tasks are supposedly conducted jointly by participants and consequently, the problem is that no single organization or individual has responsibility for network-level outcomes, regardless of whether these outcomes are positive or negative.

In Agranoff and McGuire's statement about accountability, it is not clear whether the emphasis is on *establish* or on *accountability*. If the emphasis is on *establish*, then this would mean that there is a chance to develop a research agenda to look into the question of under which conditions accountability (or any other form of control) could be established. If, as we suspect, the emphasis is on *accountability*, this would imply that because of the inherent characteristics of the form, public networks are simply not accountable (or controllable) and that researchers would have to look instead at the consequences of this phenomenon. Scholars following this line of reasoning often do have a specific "means" of control in mind (hierarchical control, political-democratic control, accountability, etc.), but these means of control seem not to apply to networks. Consistent with this line of thinking, Agranoff and McGuire conclude that "... a control orientation is problematic for collaborative structures" (2001, 309). We take a different stance here. While we agree that control in and of networks is often problematic, it is certainly not absent. Discussing the control of networks forces us to

think outside the box beyond the conventional mechanism and conceptions of control.

MECHANISMS TO CONTROL NETWORKS

It should be clear at this point that public management and organization theory scholars know very little about the control of networks and, consequently, about how various forms of control relate to network performance. To start a discussion of the issue, we will review what traditional organization theory has contributed to an understanding of the use of control mechanisms, and where possible, draw preliminary conclusions from this literature with regard to the control of networks. Although other disciplines, especially economics, political science, and law could also be drawn on to study the issue of control (see Zald 1978, 80), organizational scholars have done most of the work in the area that might be directly applicable to the study of networks.

Control mechanisms can be described along many different dimensions, including who controls (the "control agent"),⁶ the subject of control,⁷ mechanisms of control (which will be developed below), the extent or degree of control, the focus or objectives of control (i.e. the scope of activities over which control is exercised),⁸ the legitimacy of control,⁹ methods or tools of control,¹⁰ media of control,¹¹ etc. It is not possible here to discuss all these dimensions. Instead, in the tradition of organization theory, we will concentrate primarily on the mechanisms of control.

Mechanisms of control refer to the ways that control may be exercised. On the basis of the organizational literature, we can divide these mechanisms into five broad categories (see Table 1): personal/centralized control, formal bureaucratic control, output control, cultural or clan control, and reputational control. It should be mentioned that the fifth category, reputational control, is not labeled as such in the literature and is newly introduced here. In the literature one often finds a "residual category," most often called "cultural control," which includes all other mechanisms that are not hierarchical, bureaucratic, formal, or output oriented. We propose, however, to distinguish those forms of control that are based on sharing organizational goals and socialization (i.e. cultural control) from forms of control that have a relational character based on reputation. Reputational control implies that control is exercised through an understanding of the structural patterns that lead to the building of reputations. In other words, the pattern of reputation throughout the network will act to control behavior, such that those with high reputation will act to maintain their position and those with low reputation will be marginalized.

The critical issue for this paper is to develop an understanding of how each of these mechanisms might be used to control networks. There is no information available on the prevalence of these mechanisms for networks, but in Table 2 we have identified one example for each cell. While networks are unlikely to be equally divided among all five types of control, it is at least possible to identify networks that are controlled by each type of mechanism. It is likely that the empirical cases of networks listed in Table 2 are characterized by a mixture of control mechanisms. Nonetheless, their positioning in the table is based on an understanding of their

TABLE 1
Description and Examples of Control Mechanisms

<i>Control Mode</i>	<i>Description</i>	<i>Examples</i>
<i>Personal centralized control</i>	Denotes the idea of hierarchy. It relates to decisions taken at the center or top level followed by direct personal surveillance of their execution.	"Personal centralized control" (Child 1984) "Coordination by feedback" (March and Simon 1958) "Control through supervision" (Blau and Scott 1963) "Behavioral control (direct)" (Ouchi 1977, 1979, 1980)
<i>Formal bureaucratic control</i>	Written manuals attempt to standardize the behavior by clearly prescribing courses of action to be followed.	"Bureaucratic control" (Child 1984) "Programmes (activity coordination)" (March and Simon 1958) "Rules and Regulations" (Blau and Scott 1963) "Behavioral control (rules and procedures)" (Ouchi 1977, 1979, 1980)
<i>Output control</i>	Resembles market approaches to coordination by focusing on outputs rather than on behavior (as the other three mechanisms do). Outputs are measured. By comparing these results with pre-specified goals, the final output is evaluated and controlled.	"Output control" (Child 1984) "Programmes (output coordination)" (March and Simon 1958) "Performance records" (Blau and Scott 1963) "Output control" (Ouchi 1977, 1979, 1980)
<i>Cultural or clan control</i>	A system of norms and values to which organizational members conform. Socialization by sharing organizational goals.	"Cultural control" (Child 1984) "Recruitment and training" (Blau and Scott 1963) "Clan control" (Ouchi 1977, 1979, 1980) Professional relations (Drucker 1988). Regulated Self-Regulation (Schulz and Held 2005)
<i>Reputational control</i>	Reputational control implies that control is exercised through monitoring relational patterns. The content of this form is based on the reputation of network participants.	Reputational relations (Keohane 2003) Social embeddedness (Granovetter 1985) Lateral control regime (Lazega and Krackhardt 2000)

TABLE 2
Mechanisms of Control and Organizational and Network Examples

<i>Mechanism of Control</i>	<i>Object of Control</i>	
	<i>Organization</i>	<i>Network</i>
<i>Personal centralized control</i>	Family businesses	Pre-9/11 Al Qaeda network
<i>Formal bureaucratic control</i>	Public organization like government ministries	Health provision in the Netherlands
<i>Output control</i>	Newspaper companies	R & D alliance at Océ
<i>Cultural control</i>	Religious organizations	Health and human services network, Tucson, Arizona
<i>Reputational control</i>	United Nations (inter-governmental organizations)	A peer-reviewed research network

primary control mechanism. We also added examples of single organizations characterized by different control mechanisms in order to exemplify better what is meant by the different mechanisms of control.

Personal, Centralized Control

Al Qaeda has generally been characterized as a network of terrorist organizations and groups. Thus, culture, socialization, informal exchanges, etc. are important aspects in the coordination of the network. When it comes to control, however, it seems that at least prior to attempts to destroy Al Qaeda following the 9/11 attacks, the network was characterized by personal, centralized control by Osama Bin Laden and perhaps a small group of his top lieutenants (Ronfeldt and Arquilla 2001). Virtual organizations, like Nike, can also be included as an example. Here, centralized control is not necessarily represented by a person but by a relatively small group of individuals or a separate organization (similar to Bin Laden's group of lieutenants or Nike's central office). These entities contract out almost all functions but retain the name and the function of coordination among the parties. All companies that are linked to the central entity are expected to produce a specific product in concert and are contractually linked and dependent on it. The central entity has the possibility of directly controlling what is going on in the network (Jonas 1986).

Formal, Bureaucratic Control

Health provision is also a case of network governance, since it is an example of a complex system of partnerships among diverse government, civic, business, and nonprofit actors (cf. Kenis 2006b; Provan et al. 2003). But in the Netherlands at least,

the mechanism by which the network is controlled is often formal and bureaucratic, even referred to by some commentators as the last “soviet kolkhoz.” The overall system of health provision is characterized by a very complex set of rules and regulations. For example, hospitals have hardly any options for taking their own initiative regarding the treatments offered, the number of beds, the governance structure, the amount of money to be spent on treatments, etc. The Ministry of Health almost completely bureaucratically controls the system. The main reason is probably that according to Dutch law, health care in the Netherlands has to fulfill three criteria: quality, accessibility, and effectiveness. The presumption is that these types of outcomes are only likely to occur when a formal bureaucratic control mechanism is in place.

Output Control

Rutten (2002) describes in his dissertation the R & D networks of the copy machine manufacturer Océ. What becomes clear from his study is that although the network is described in terms of horizontal, voluntary, cooperative multi-firm relations, the mode of control is characterized by a system of output control. This type of control of networks is closely related to discussions on public-service reforms (i.e., the thermostatic control discussed by Hood, 2002), discussions of new public management (see Lynn 1998), and discussions of network accountability. Regarding accountability, Agranoff and McGuire (2001, 311) have stated that “we must be able to measure the outcomes and performance of networks in order to assess how accountable a particular network is . . .” Thus, holding network members accountable for network-level outputs can be an important way in which networks can be controlled through non-bureaucratic and non-personal means.

Cultural Control

The fourth cell contains cases where networks are controlled by cultural control. Here control is based on the monitoring and evaluation of attitudes, values, and beliefs. Since these are typically acquired more slowly than are manual or cognitive abilities, ceremonial forms of control require the stability of membership that characterizes the clan. An example is the tightly knit community of Hassidic Jews who trade diamonds without having to test each gem for purity.

Cultural control was also critical in the mental health network in Tucson, Arizona, recently discussed by Provan, Isett and Milward (2004). These researchers found that norms and values of cooperation embedded in the profession prevailed and guided network actions. Consequently, from an external control perspective one could rely on cultural control of the network while relaxing the often more dominant coercive, contract-based control imposed by the state government agency that funded the network.

Reputational Control

The final cell contains cases where networks (as objects of control) are controlled through reputation and the structure of reputation throughout the network.

Reputational control assumes that the pattern of relationships in a network will be based on reputation, with the flow of information and resources in the network largely controlled by the desire to gain or maintain reputation. Once we know that the actors (in a hierarchy, network or any other form of coordination) are involved in a relational pattern based on reputation that is instrumental for achieving the objectives of coordination, other forms of auditing and surveillance (often more costly, overt, and hierarchical) can be minimized. Relational structures hold information about the reputation of actors in the network. Whereas the control capability of clans resides in the knowledge that the members of the clan are socialized or indoctrinated towards achieving the “right” objectives, the control capability of reputational control resides in the fact that the relational structure is the result of processes of reputation-building. The specificity of reputational control resides in the presence of links through which the behavior of an actor toward any other actor becomes publicly known. Thus, reputation becomes critical in affecting future behavior (Granovetter 1985). Consequently, one can expect actors in such settings to have an incentive to behave well toward each other even if they are only occasionally linked and do not necessarily share the same beliefs. This is what has been referred to elsewhere as a “lateral control regime” (Lazega 2000; Lazega and Krackhardt 2000). For instance, reputational control will be a primary form of control in a network set up to produce a collective idea, service, or innovation (von Hippel 2006). In this case, organizations that do not contribute to this objective will gain a low reputation and will be successively pushed towards the fringes of the network, eventually becoming isolates.

Table 2 presents the five mechanisms of control discussed above, giving both organizational and network examples of each. At this point in the development of our ideas, we cannot be at all certain that our mechanisms of control represent the full range of mechanisms available, especially for controlling networks. In addition, our listing of examples is somewhat speculative, especially for our network examples. These issues can only be resolved through empirical studies that take an inductive approach. For the time being we will use the organizationally based theoretical framework to formulate propositions on how various forms of control relate to network performance.

CONTROL AND NETWORK EFFECTIVENESS

Control is, of course, not a goal in itself. Instead, as stated in the introduction, it is rather a *means* to achieve certain goals. The question then is whether and how control contributes to achieving these goals. Thus, an appropriate focus for the control of networks is the degree of goal attainment (or performance), and alternatively, the degree to which the network minimizes production of negative externalities. This perspective is consistent with Provan and Milward’s (2001) discussion of “network level effectiveness” and “community level effectiveness” for evaluating public sector networks. The focus here, then, is to explain the extent to which different control mechanisms contribute to these objectives.

Since control has not received much attention in research on networks, and since there has also been little empirical work on network-level effectiveness, not surprisingly there is very little that is known about the impact of control on the performance of networks. It is possible, however, to start to develop a better understanding of the topic by drawing on the organizational literature to begin to understand the relation between control and effectiveness. The main effort in this regard has been by scholars who have utilized a contingency theory approach. The work done in this area is summarized in Table 3. The theory starts from the assumption that there is no one best way of organizing, but also that not every way of organizing (or control) is successful to the same degree (Galbraith 1973). Consequently, from a contingency perspective, goal attainment is best achieved when there is a "fit" between the control mechanism applied and various organizational contingency factors, the most prominent of which are environmental uncertainty and complexity, task interdependence, and size.

In the literature on networks, size, or the number of organizations in the network, is a highly underestimated dimension. This is especially true when compared to the

TABLE 3
Effective Modes of Control Based on Contingencies

<i>Contingency Factors</i>	<i>Organization</i>	<i>Network</i>
<i>Size</i>		
<i>Small</i>	Personal centralized control	Personal centralized control and cultural control
<i>Large</i>	Bureaucratic formalized control*	Cultural control and reputational control
<i>Task Interdependence</i>		
<i>Pooled</i>	Bureaucratic formalized control	Bureaucratic formalized control, clan control and reputational control
<i>Sequential</i>	Output control	Bureaucratic formalized control, clan control and reputational control
<i>Reciprocal</i>	Clan control	Clan control and reputational control
<i>Environmental uncertainty/complexity</i>		
<i>Low</i>	Bureaucratic formalized control and personal centralized control	<i>Low</i> Bureaucratic formalized control, personal centralized control, clan control and reputational control
<i>Moderate</i>	Output control	<i>High</i> Clan control and Reputational control
<i>High</i>	Clan control	

*"Bureaucratic formalized control" includes behavior and output control.

Sources: For the column on organizations: Pugh et al. 1968; Blau and Schoenherr 1971; Thompson 1967; Van de Ven et al. 1976; Child 1984; Galbraith 1973; Lawrence and Lorsch 1967; March and Simon 1958; Mintzberg 1983; Burns and Stalker 1961; Khandwalla 1977; Hage et al. 1971.

organizational literature where size traditionally plays an important role. But it is clear that networks can differ substantially in size and that we can expect size to have effects in terms of the governance and manageability of networks (Provan and Kenis 2005). We define network size not in terms of a specific number of network members, but in terms of control. Large networks are those in which no one actor can describe or understand the full composition and relational structure of the network.

In small networks, effective control of the behavior of actors in the network and related processes can be achieved by any of the five control mechanisms. In contrast, large networks are likely to have a greater degree of goal incongruence. When a large number of heterogeneous actors come together (as in a health care network, where medical specialists, general practitioners, social workers, administrators, and the like are present), the chances of goal incongruence are high. Also, knowledge about the transformation process in large networks is likely to be limited as well as the ability to measure outputs of the network. Output control becomes problematic when, due to large size and diverse goals, the output itself must be either vague or multi-dimensional. All this makes "rational" forms of control difficult.

Consequently, in large networks, alternative forms of control are needed. Clan control is possible, but is only appropriate when the actors in the network share attitudes, values, and beliefs. Although one might expect this to be rather unlikely in large networks, there are a number of prominent empirical cases of large, extended networks in which this form of control is prominent, especially in crime-oriented networks (Al Qaeda, the Sicilian Mafia, the Japanese Yakuza or La Cosa Nostra; see Standing 2003). However, the most likely and appropriate mechanism to achieve control in large, diverse networks is reputational control. Even in cases where actors in the network do not necessarily share values, processes of reputation-building may be an effective form of control (see Morselli's 2001 analysis of drug dealing network in which reputation seemed to play a much more prominent role than elimination and intimidation). This leads us to the following two propositions:

Proposition 1a:

In small networks, any of the five mechanisms of network control are likely to be effective.

Proposition 1b:

In large networks, only reputational control, and to a lesser extent cultural/clan control, are likely to be effective mechanisms of control.

Task interdependency has turned out to be an important contingency for organizational design, but what about the relationship between task interdependency and the effective control of networks? Task interdependency says something about the degree to which the fulfillment of a certain task is dependent on the fulfillment of another task. The idea goes back to Thompson's distinction between three types of task interdependency: pooled, sequential, and reciprocal (Thompson 1967). Networks are often considered as systems in which loose coupling prevails. Within our framework the question then becomes whether some of the types of task interdependency are prevalent in networks, how these types of task interdependency influence goal congruence, and the ability to measure behavior or output. On the basis of this

knowledge conclusions can be formulated as to the most effective mechanisms of control.

Task interdependency in networks is a complicated issue. We expect the degree of task interdependency to be strongly related to knowledge about the transformation process. The higher the task interdependency (for example reciprocal interdependency), the more difficult it is to observe exactly how inputs are transformed into outputs. The way in which activities in a network are pooled can be appropriately described and observed in the design of a network. The same is true for sequential interdependency. For instance, a patient in a health system might have to go through a prescribed sequential path to resolve a particular health problem such as diagnosis, surgery, rehabilitation, and checkup. In the case of reciprocal interdependency, however, knowledge about the transformation process is limited since the flow of knowledge, tasks, and resources is so complex, with network members often displaying unanticipated and emergent behaviors. In this case, design analysis and the use of conscientious knowledge about network operation are limited and consequently, control becomes problematic (Perrow 1984; Weick 1976). An example of this would be the delivery of a range of health and human services to patients with serious mental illness (Provan and Milward 1995).

In networks with low task interdependency, formal bureaucratic control (through behavior or output control), cultural/clan control and reputational control are appropriate mechanisms of control. In contrast, in networks with high task interdependency, where the knowledge of the transformation process is low, behavior control is not possible.

On the basis of the above we formulate the following propositions:

Proposition 2a:

In networks with pooled or sequential task-interdependency, formal bureaucratic control (through behavior or output control), clan control, and reputational control are likely to be effective forms of control.

Proposition 2b:

In networks with reciprocal task-interdependency, formal bureaucratic control (only through output control), clan control and reputational control are likely to be effective forms of control.

In what follows, we will treat environmental uncertainty and environmental complexity together. Given the limited research and findings on the relationship between the design of networks and their relationship with the environment in which they operate (for an exception see Provan and Milward 1995), we limit ourselves to formulate propositions about the relationship between the degree of uncertainty/complexity/heterogeneity and the appropriate form of control. Consistent with contingency arguments at the organizational level, it is reasonable to expect that for networks, the degree to which they are confronted with environmental complexity and dynamics will differ. Some networks operate in rather stable and simple environments whereas others are part of complex and dynamic environments (for example, terrorist networks before 9/11 and after 9/11).

We expect the degree of environmental uncertainty and dynamics to have an effect on the goal congruence of the network. The fact that networks have to adapt to changes in the environment will undermine their goal congruence. Networks adapt to environmental changes through the actions of individual network participants. When change is rapid and uncertain, network organizations will make efforts to adapt in different ways, thus putting strain on network cohesiveness. In other words, we assume that a high level of environmental uncertainty and complexity will have an effect on the ability to measure outputs and knowledge about the transformation process.

Consequently, when environmental uncertainty and complexity for the network is low (all other things being equal), any form of control is appropriate. However, when environmental uncertainty and complexity are high, neither behavior nor measurement control will be possible because these are typically based on known, highly predictable situations. Here, no "rational" form of control is readily available. Personal control is also problematic since change relies on the capacity of a single individual to recognize and adopt to the change and then to implement change throughout the network.

Thus, when external uncertainty and complexity are high, only cultural/clan control or reputational control will be effective. These two types of control can be expected to produce better insights on whether and how the network recognizes changes in the environment of the network. They can also be expected to react faster and more flexibly to such changes. It is not that norms and reputations will change. These will remain relatively stable, thereby facilitating adaptability to external change. The problem with these types of control might, however, be that if environmental dynamics imply a change in beliefs (in the case of clan control) or a change in the assessment of reputation (in the case of reputational control), networks would not be expected to respond quickly to such changes. Consequently, the network actors might be using the "wrong" objectives or "wrong" reputation-building processes.

Proposition 3a:

In networks with low environmental uncertainty/complexity/heterogeneity, formal bureaucratic control, output control, cultural/clan control and reputational control are likely to be effective forms of control.

Proposition 3b:

In networks with high environmental uncertainty/complexity/heterogeneity, cultural/clan and reputational control are likely to be effective forms of control.

A FEW CLOSING OBSERVATIONS

We have argued that the control of network performance is an important issue. Networks have become more and more prevalent in the delivery of public services, but we have hardly any idea about whether or not they are really effective. What is clear is that they do not perform effectively simply because they are not hierarchies,

in contrast to what policy makers often seem to believe. Moreover, there is extensive evidence in the literature about the unintended consequences of networks. This problem may be especially prevalent in public networks where there are significant accountability problems (Agranoff and McGuire 2001) due to a disparity between network and organizational goals. This situation results in limited commitment by network members. Use of inappropriate mechanisms of control could exacerbate the problem by producing a range of consequences, including goal displacement (Selznick 1949; Kenis 2001a), additional costs (Geringer and Hébert 1989), conflict (Van de Ven and Walker 1984; Kenis 2006a), resistance to innovation (Kirkpatrick 1999), and cheating (Hood 2002).

Consequently, we explored the appropriateness of control mechanisms for networks. We based our discussion on contingency theory since this theory has been explicit about the fact that certain control mechanisms are more appropriate in certain situations than in others. The main challenge has been to figure out whether the contingency factors, which have been found to be relevant in the case of organizations, also apply to networks in the same way.

This approach produced a number of conclusions. First, we can conclude that while both organizations and networks are responsive to the same general contingency factors that affect control, the impact of these contingencies on networks is not the same as for organizations. In addition, not all networks are the same, meaning that different mechanisms of control may be more or less effective, depending on key network characteristics related to size, task interdependence, and environmental uncertainty. Since the mechanisms for controlling organizations have been validated far more often than for networks, there is the tendency to apply findings regarding organizational control to networks. On the basis of the results of our work in this paper, we have concluded that organizations and networks are different regarding their control.

Second, what we refer to as "reputational control" has been introduced as a unique form of control, not previously distinguished in the organizational or network literature. Despite its importance, however, reputational control is not by definition the most appropriate form for the control of networks. Reputational control supposes that based on an understanding of network structure and process, the performance of the network will also be known. This might be the case in some type of networks but certainly not under all circumstances.

Third, what is also striking is that output control is hardly an option for controlling networks. For network scholars this might not come as a surprise but it is important to conclude that this conclusion can be reached using a contingency perspective. This is important for discussions with policy makers, who tend to be strong proponents of output control. At the same time it should encourage the exploration of alternative ways of controlling the performance of networks (cf. Korssen-Van Raaij 2006).

Fourth, our work suggests that we should move from use of contingency theory, in which each contingency is assessed individually, to a more systematic approach looking at configurations of contingencies. These configurations could be more revealing about the appropriate control mechanisms than the sum of the individual contingency factors (see Drazin and van de Ven 1985).

Finally, a number of limitations should be mentioned related to the use of contingency theory (see Schoonhoven 1981). Although it turned out to be possible to formulate propositions on how various forms of control relate to network performance, the use of contingency theory has clear limitations. For one thing, there is limited research on the validity of the proposed relationships. While conceptually appealing, empirical validation of the relationships proposed would be a complex undertaking in terms of data collection and analysis.

Second, contingency theory assumes that design parameters for organizations can be changed in such a way that a better fit between them and contingencies can be achieved. Although the contention that organizations can easily be redesigned is already a controversial issue in the organizational literature, we can expect this to be even more difficult in the case of networks. Interorganizational networks are composed of sovereign actors, and thus, changing the design of these networks can be expected to be a difficult issue. Consequently, what becomes more important is to concentrate on the conditions explaining how likely the presence of a certain form of control is in a given network. For example, when the object of control is embedded in a well-defined legal territory, such as a nation state, formalized bureaucratic control and output control are likely control mechanisms. When it comes to global networks, however, the effectiveness of these more traditional mechanisms is more doubtful, given the absence of a central control institution. Here one would probably have to rely on cultural/clan and reputational control (see e.g. Dose 2002; Thorsten, Wiite, Reinicke, et al. 2003).

Third, the use of contingency diverts our perspective from other factors that might be specifically important in the case of networks. More inductive research is necessary to identify these kinds of factors. For example, it could be valuable to identify factors predicted by neo-institutional theory. On the basis of this theory, it would be reasonable to find that the relationship between performance of networks and the control mechanism applied is contingent on social norms and expectations (see Zald 1978; Gupta et al. 1994). Another possibility would be to rely on the fast-developing accountability literature in the field of global governance in which networks play a promising role. Since these networks often are instruments of public policy, scholars in the field of public administration, law, and political science increasingly study how the accountability of these networks can be achieved (e.g., Keohane 2003; Benner, Reinicke, and Witte 2004).

Despite the relative absence of theory and empirical work on the control of networks, it should be clear after reading this paper that control is an important area of research for public network scholars. Although we are still far away from any systematic knowledge about the prevalence and effectiveness of network control mechanisms, there is a substantial body of literature available on both organizations and networks that can be drawn on to guide work on the topic. We have proposed some of the challenges inherent with work in this area as well as some directions that might be taken. Because networks have become so prevalent in the delivery of public services, management and organizational scholars need to make a concerted effort to broaden their understanding of the control of networks. This knowledge can then be disseminated to public managers and policy makers who can design, monitor, and manage networks more effectively.

NOTES

1. Some of the major studies on the topic include work by March and Simon (1958), Blau and Scott (1963), Thompson (1967), Lawrence and Lorsch (1967), Child (1973, 1984), Galbraith (1973), Ouchi (1977, 1979, 1980), Mintzberg (1979, 1983), Bartlett and Goshal (1989), and Martinez and Jarillo (1991).

2. In their seminal book, *The External Control of Organizations*, Pfeffer and Salancik (1978) examined how organizations are constrained by environmental uncertainty and resource dependencies, and how organizations respond to uncertainty through various bridging and buffering strategies. Although we borrow Pfeffer and Salancik's title, we focus not on organizations, but on networks, and on intentional control imposed by external sources (cf. Zald 1978).

3. This is a very interesting conceptual piece. Although the article and the issues Zald addressed are highly relevant from a network governance perspective, the article has rarely been cited over the last 25 years, according to the Social Science Citation Index.

4. "Hierarchies have a difficult time fighting networks. [...] It takes networks to fight networks. Governments... have to adopt organizational designs and strategies like those of their adversaries.[...] Whoever masters the network form first and best will gain major advantages.[...] However, governments tend to be so constrained by hierarchical habits and institutional interests that it may take some sharp reverses... before a willingness to experiment more seriously with networking emerges" (Ronfeldt and Arquilla 2001, 20 f.).

5. This corresponds with the argument of Hennart (1993), who made a significant contribution to transaction cost theory by distinguishing between *methods of organizing* (the price system and hierarchy) and *economic institutions* (markets and firms).

6. This might include: the parliament (via elections, parliamentary committees, parliamentary questions, informal lobbying of ministers by MPs, lobbying by outsiders), a ministry or department (via framework documents and business plans, performance indicators, etc.), a citizen's charter, local authorities (via elections, publicly open meetings and minutes, monitoring officers, competitive tendering regulations, scrutiny committees, etc.), third party mechanisms (ombudsmen, an audit commission, courts, tribunals) mechanisms of property (via registers of interest, codes of conduct, rules for appointments, encouragement of transparency), the market (via consumer choices), horizontal mechanisms (professional accountability from peers, representativeness of board members), press and other media, and many different kinds of stakeholders (see McConnel 1996).

7. Persons, groups, organizations, industries, or as we discuss here, networks.

8. This could refer to control over almost any objective (see Kenis 2001b), but our focus here is primarily goal attainment and negative externalities.

9. These might include: the degree to which those who control are identifiable to those who are controlled; the degree to which those who are controlled are identifiable to those who control; the degree to which those controlled and the controllers share norms; the degree to which the controlled trust that the controllers abide by shared norms; the degree to which institutions exist that provide settlement of disputes over the interpretation of these norms, and whether the rules have abided them (cf. van Kersbergen and van Waarden 2001, 27).

10. This might include regulation, incentives, payments, infiltration, etc. (cf. Howlett, 2001).

11. This might include power, money, information, etc.

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