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# **Measures and conditions of success in public sector knowledge networks**

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# Measures and conditions of success in public sector knowledge networks

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## **Abstract**

*Interorganizational networks are increasingly the subject of both theoretical and empirical research in sociology, economics, organizational behavior, and public and business management. While the most common network concepts and studies have focused on multi-organizational forms of production, "network" has also emerged as a way to describe how organizations share and integrate knowledge and information. This paper focuses on a type of network that is increasingly important in public affairs, but largely unaccounted for in the extant literature – the public sector knowledge network. The paper synthesizes and augments the exiting literature to include public sector knowledge networks. It then identifies performance measures that can be used to evaluate them at the network, organizational, and individual levels of analysis and identifies critical success factors that pertain to each level.*

## **Introduction: Public sector knowledge networks**

The concepts and challenges of organizational networks are important to understanding the operation of public sector and the performance and prospects for e-government. Network concepts have a fairly long history in public affairs scholarship. In political science, interorganizational policy networks have long been recognized as an important feature of political influence and action (Laumann & Knoke, 1987; Raab, 2002) The main purpose of these networks is to exert influence on the political process in order to shape policy and resource allocation decisions that affect various constituencies. Policy networks are usually informal; they have no fixed organizational or management structure. In this respect they are unlike most other notions of network. However, they are a form of collective action, designed to influence any number of policy concerns. Regulation of the financial services industry, rules for the use of public lands, mechanisms for school choice, or protection of personal privacy in health care are just a few of the hundreds of concerns that give rise to policy networks.

Service delivery networks are a common method for implementing public policies, whether through traditional intergovernmental arrangements, or through networks of nonprofit (or even for profit) service providers linked by contract to a government agency (Provan and Milward, 1995). In these networks, the main purpose is to deliver specific services to a client population with high quality and reasonable cost. Many publicly-funded human services, such as mental health services, day care, and employment readiness training use this network service delivery model. Service delivery networks are the most widely recognized and most studied form of public sector network. They have been devised to achieve broad geographic coverage, economy, and flexibility in service systems.

The growth of service delivery networks has given rise to an important public administration research agenda. Key questions of public network management parallel the elements of traditional administrative theory (Agranoff & McGuire, 2001): What are the main functions of public network management? What group processes support network functions? How do networks provide flexibility and resilience? Can mutual responsibility substitute for traditional notions of accountability? What kind of cohesion holds networks together in the absence of a legal charter? How does organizational power play out in network relationships? Do public management networks produce results or discoveries that traditional forms of management cannot produce?

In terms of practice, O'Toole (1997) argues that practitioners need to take networks more seriously and incorporate network concepts into the fabric of contemporary administration. Network thinking and action are necessary to address the demands of the increasing number of "wicked problems" (Rittel and Webber, 1973) that confront the public sector. These are the problems that cannot be divided into logical parts, assigned to suitably expert organizations, and brought back together into a comprehensive solution. Wicked problems are more organic; they have multiple causes and interacting effects that do not lend themselves to traditional division-of-labor approaches. Welfare reform, achieving high quality and affordable health care, and protection of the environment all present ample examples of wicked problems. Network forms of organization are increasingly needed for other reasons. One is a growing public desire for government to set broad action agendas, but to leave the implementation to others (the well-known "steering, but not rowing" metaphor of Reinventing Government (Osborne and Gaebler, 1992)). Political demands for broad inclusion in decision making and implementation favor networked forms of governance. Layers of overlapping mandates almost guarantee unexpected, even perverse, outcomes unless administrators learn to recognize and deal with a cross-cutting network of requirements and actors.

Information, of course, is crucial to the foregoing concepts of public sector networks. Information is essential to the policy network where members try to influence decision makers with data, analysis, and stories that favor one position or another. In service delivery networks, information must flow among the various organizations in order to support and document the service delivery process. However, organizational networks whose purpose is knowledge and information sharing have emerged mostly with the growth and adoption of advanced networking technologies and the development of e-government. These have not been extensively studied. Examples of such networks include the growing number of state and national efforts to share geographic information, such as the National Spatial Data Infrastructure (NSDI) initiative in the US federal government. Other efforts support communities of practice with information systems, communication tools, and data resources that improve professional practice. Such networks also gather, analyze, and share information about program performance among participating agencies in such fields as human services, or to establish monitoring and communications functions for public health, government financial management, and national security. These divergent domains of public interest are all served by an increasingly important form of organization: the public sector knowledge network (PSKN), which can be defined as a combination of interorganizational relationships, policies, information content, professional knowledge, work processes, and technologies brought together to achieve a collective public purpose. These purposes, as illustrated above, include cross-program coordination, cross-functional collaboration, and creation and use of shared repositories of detailed information.

The next section reviews the research literature of interorganizational networks focusing on the ways in which good performance (or measures of success) are characterized. The succeeding section identifies critical success factors (or conditions for success) also present in the literature. These two literatures are then combined to offer a typology of PSKN success that has utility for both further research and the practical design and management of such networks.

## **Performance of organizational networks**

Most research into multi-organizational issues falls into the field of interorganizational relations (IOR). Much of this work has explored interorganizational relations and multi-organizational forms from the point of view of a single participating private sector firm, although a growing body of research focuses on public sector networks. In addition, research on interorganizational information sharing and integration and associated knowledge management challenges is being conducted in both the public and private sectors. Consideration of public sector knowledge network performance draws from all of these research areas. A great deal of this research focuses on the reasons for IOR formation, which in turn suggest criteria for assessing their success. Oliver (1990) presents these reasons as a set of critical contingencies that motivate organizations to enter into relationships with others and set conditions around those relationships. These include necessity (the need to meet legal or regulatory requirements), asymmetry (the potential to exercise power over another organization or its resources), reciprocity (the pursuit of

common or mutually beneficial interests), efficiency (the need to improve internal cost-benefit ratios), stability (the need to reduce environmental uncertainty) and legitimacy (a need to demonstrate or improve reputation or prestige).

Barringer and Harrison (2000) summarize the literature on IOR formation into broad theoretical categories. Transaction cost economics focuses on the ways in which boundary-spanning activities can minimize production or transaction costs. Decisions to make, buy, or partner, as well as decisions to subcontract for specialized activities are made in the transaction cost economics tradition. The overall goal is for an organization to seek the lowest cost, highest benefit IOR alternatives (see Williamson, 1975 and 1991; Child and Faulkner, 1998, and Jarillo, 1988 for a range of concepts and applications).

The resource dependence perspective (introduced by Pfeffer and Salancik, 1978) focuses on the motivation for an organization to meet its essential resource needs by controlling its own critical resources, by gaining some form of control over external resource providers, and by increasing the resource dependence of others. Firms may enter into resource dependent relationships to increase their own competitiveness (e.g. Child and Faulkner, 1988), to take advantage of complementary assets (e.g., Fisher, 1996), or to build unique joint market power (Harbison & Pekar, 1998).

Strategic choice theory emphasizes the need to increase internal capability or decrease competition relative to others in an industry (Jarillo, 1988). In IOR terms, firms pursue profit and growth by setting up barriers to the entry of others, by increasing their influence or political power, and by entering into relationships that increase access to resources, improve efficiency, or share risks (Powell, 1990).

The stakeholder theory of the firm (first developed by Freeman, 1984) views the organization as the hub of a set of stakeholder relationships. In this view, IORs are formed to align or coordinate stakeholder interests or to reduce environmental uncertainty.

Organizational learning theory is concerned with a firm's ability to recognize, absorb, and apply new knowledge (Kumar and Nti, 1998 for example) and thus to improve its competitive position. One goal is to absorb knowledge from partners in order to increase competence and add value to the organization. Learning is also seen to be an effective way to transfer and share knowledge across cooperating firms (Powell, Koput and Smith-Doerr, 1996). Learning is also a motivation for forming informal relationships such as trade and professional associations (Mariolis and Jones, 1982).

Institutional theorists focus on the ways in which institutional pressures for legitimacy and acceptance push organizations to conform to prevailing social norms and to associate with firms whose legitimacy and reputation are well established (DiMaggio and Powell, 1983). To achieve their own legitimacy, organizations mimic the IORs of others whose legitimacy is already established. In addition, conformance with norms and rules may also be a simple necessity for firm survival (Oliver, 1990; Alter and Hage, 1993).

The social capital literature emphasizes the richness of ties and resilience of relationships that emerge in a culture of shared norms, values, and experiences (Putnam, 1993; Fountain, 1998). In network literature, this idea has been expressed as the "multiplexity of ties," (Scott, 1991) meaning the strength of relationships that comes from multiple activities and commitments among network members, particularly when the members offer complementary strengths. Anand, et al (2002) assert that this sort of "social capital is the primary means by which organizations import external knowledge."

Other IOR research focuses more directly on the outcomes of multi-organizational efforts. Saxton (2002) found that success of business alliances entails overall satisfaction, the achievement of self-interest goals, and the enhancement of core competencies for each partner. Coalitions among human service organizations were judged more successful when they achieved their tangible common goals as well as interim or related goals, met their process goals, were recognized by important external actors, and survived environmental threats (Mizrahi and Rosenthal, 2001). Provan and Milward (2001) argue that service delivery networks can be evaluated by such criteria as creation and maintenance of an administrative structure for the network, growth in network membership, the range of services provided to network members, the degree to which these services are coordinated and integrated, and the extent to which the network minimizes organizational conflict and duplication of effort. Research on interagency

information sharing suggests that public agencies engage in information sharing and judge it more successful when it achieves both collective and self-interest benefits at several levels: policy domain, mission or program, agency, and dominant profession (Dawes, 1996).

The literature on knowledge management emphasizes the use of knowledge and information to “do something useful with knowledge, to accomplish organizational objectives through the structuring of people, technology and knowledge content” (Davenport, et al., 1998). Knowledge management projects focus on creation of knowledge, improving access to knowledge, enhancing the knowledge environment, and managing knowledge as an asset. Further, the knowledge asset (which encompasses a continuum of data, information, and knowledge) is designed to persist beyond the tenure of any key individuals (Davenport and Prusak, 1998). Management systems research shows that distributed data networks, which are essential to knowledge networks, perform well when they promote high quality data and offer efficient distribution and sharing mechanisms (Jain, et al. 1998).

### **Categories and measures of success for public sector knowledge networks**

From their extensive work with networks of mental health providers, Provan and Milward developed a framework for assessing the effectiveness of public sector service delivery networks (1995, 2001). The framework provides for three levels of analysis: community (the population to be served), network (the organizational manifestation of the working arrangements among agencies), and organization (the individual agencies that participate in the network). This conceptualization serves as a point of departure for building a framework for evaluating the success of public sector knowledge networks.

A key difference between service delivery networks and knowledge networks requires adjustments to the Provan and Milward framework as a basis for evaluating knowledge networks. First, the primary community served by a knowledge network is not external to the participating organizations as it is with service delivery networks. The organizational and individual participants in knowledge networks are their own “customers” or “clients.” The knowledge resources and other benefits that the network provides serve directly the knowledge and information needs of the participating organizations.

Second, individual professionals play an important role in knowledge networking that should be considered apart from the interests of the organizations that employ them. Individual participants negotiate and manage organizational participation and individually use the network’s knowledge and information resources. This perspective follows Ring and Van de Ven who posit that cooperative IORs develop due to the actions, decisions, and interpersonal relationships among individuals within the participating organizations rather than from organizational factors alone (Ring and Van de Ven, 1994).

Taken as a whole, the foregoing literature suggests several salient categories of success measures: structural measures that address network and organizational forms and viability, performance measures that address the stated objectives of the network and its participants, and process and relationship measures that address the quality of the interactions that constitute network dynamics. These levels of analysis (network, organization, and individual) and categories (structure, performance, and interaction) are used to summarize measures of PSKN success as shown in Table 1.

Different sets of measures are appropriate for evaluating PSKN success in terms of the network, participating organizations, and individual professionals. For instance, institutionalization and data sharing mechanisms have meaning only at the network level. By contrast, some measures pertain to more than one level of analysis, but carry different meanings and therefore require different metrics at each level. For example, knowledge acquisition and learning“ pertain to both the organizational and individual levels of analysis. However, the kind of knowledge that an individual might gain from network participation likely to enhance his or her expertise in a particular profession (an urban planner, for example, might learn how to use geographic analysis tools). At the organizational level, new knowledge might be embodied in enhanced planning processes that take into account new information repositories, different stakeholders, or special legal requirements.

<b>Level of Analysis</b>			
	<b>Network</b>	<b>Participating Organizations</b>	<b>Participating Individuals</b>
<b>Structural measures</b>	<ul style="list-style-type: none"> <li>• legitimacy</li> <li>• creation and maintenance of a network administrative structure</li> <li>• institutionalization</li> <li>• growth in network membership</li> <li>• network stability and resilience in the face of environmental threats</li> <li>• resource growth</li> <li>• survival beyond the tenure of key individual participants</li> </ul>	<ul style="list-style-type: none"> <li>• organizational survival</li> <li>• enhanced organizational legitimacy</li> </ul>	
<b>Performance measures</b>	<ul style="list-style-type: none"> <li>• achievement of specific long-term &amp; interim substantive goals</li> <li>• joint product development</li> <li>• range of services provided to network members</li> <li>• integration and coordination of services provided to network members</li> <li>• growth in knowledge content and use</li> <li>• high quality data</li> <li>• efficient data distribution and sharing mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>• organization-specific performance goals are met</li> <li>• efficiency improvements</li> <li>• operational improvements</li> <li>• resource acquisition</li> <li>• contribution to core organizational competencies</li> <li>• knowledge acquisition and learning</li> </ul>	<ul style="list-style-type: none"> <li>• individual professional goals are met</li> <li>• contribution to core professional competencies</li> <li>• knowledge acquisition and learning</li> </ul>
<b>Interaction measures</b>	<ul style="list-style-type: none"> <li>• achievement of process goals</li> <li>• equity or "fair dealing" among participants</li> <li>• relationship strength (multiplexity)</li> </ul>	<ul style="list-style-type: none"> <li>• enhanced reputation or legitimacy</li> <li>• equity or "fair dealing" among participants</li> <li>• minimum conflict across membership in multiple networks</li> <li>• overall satisfaction with the network</li> </ul>	<ul style="list-style-type: none"> <li>• enhanced reputation or legitimacy</li> <li>• minimum role conflict across multiple networks</li> <li>• building of social capital</li> <li>• overall satisfaction with the network</li> </ul>

### **Critical success factors or conditions for success**

The research literature also offers a wide ranging view of the conditions that are likely to promote success on the foregoing measures. Sociologists have long identified trust (Gulati, 1995, Nooteboom et al., 1997), and the reputation of participants (Granovetter, 1985; Hill, 1990) as elements in successful networks.

In their study of human service coalitions, Mizrahi and Rosenthal (2001) identified commitment to the network goal, competent leadership, commitment to unity, equitable decision making structures and processes, and mutual respect and trust. Reviewing the experiences and performance of interorganizational and intergovernmental information sharing and service delivery networks, Dawes and Pardo (2002) concluded that more successful projects set realistic and measurable expectations but did

so within a holistic understanding of the issues and challenges surrounding their particular effort. More successful projects attended to the ways in which information flowed through work processes and infused practices in the participating organizations. They also marshalled a variety of financial and professional skills, employed diverse communication methods, shared risks and benefits among the partners, and selected competent leaders and methods for managing complexity.

Knowledge management programs reviewed by Davenport, et al. (1998) were more successful when they focused on performance or industry value, built compatible technical and organizational infrastructures, adopted data and technical standards, and, most importantly, exhibited a knowledge-friendly culture. Such a culture has a positive orientation toward and values knowledge, does not inhibit people from sharing knowledge, and encourages and rewards learning.

Tables 2a, 2b, and 2c present one way to consider how these conditions may be linked to network, organization, and individual success. The tables present a high-level overview of the levels of analysis; the structural, performance, and interaction measures associated with each level; and the conditions which appear to be necessary (or at least desirable) for successful outcomes. Structural measures of success appear to be most influenced by conditions in which the public value of the network is well recognized, the network and partners enjoy positive reputations, and legal and financial underpinnings are strong. Success on performance-oriented measures seems to depend in large measure on sound leadership and management practices, good quality data and appropriate infrastructure, and a culture that provides incentives and rewards for knowledge and information sharing. Successful processes and relationships appear to rest on a combination of reputation, trust, competence, and supportive culture.

<b>Table 2a. Measures of Structural Success of Public Sector Knowledge Network with Associated Conditions for Success</b>			
<b>Level of Analysis</b>			
	<b>Network</b>	<b>Participating Organizations</b>	<b>Participating Individuals</b>
<b>Structural measures</b>	<ul style="list-style-type: none"> <li>• legitimacy</li> <li>• creation and maintenance of a network administrative structure</li> <li>• institutionalization</li> <li>• growth in network membership</li> <li>• network stability and resilience in the face of environmental threats</li> <li>• resource growth</li> <li>• survival beyond the tenure of key individual participants</li> </ul>	<ul style="list-style-type: none"> <li>• organizational survival</li> <li>• enhanced organizational legitimacy</li> </ul>	
<b>Conditions for success</b>	<ul style="list-style-type: none"> <li>• <i>reputation of network and partners</i></li> <li>• <i>recognition of public value served by the network</i></li> <li>• <i>legal status</i></li> <li>• <i>diverse financial resources</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>reputation of the organization</i></li> <li>• <i>recognition of public value served by the organization</i></li> <li>• <i>legal status</i></li> </ul>	

<b>Table 2b. Measures of Performance Success of Public Sector Knowledge Network with Associated Conditions for Success</b>			
<b>Level of Analysis</b>			
	<b>Network</b>	<b>Participating Organizations</b>	<b>Participating Individuals</b>
<b>Performance measures</b>	<ul style="list-style-type: none"> <li>• achievement of specific long-term and interim substantive goals</li> <li>• joint product or service development</li> <li>• range of services provided to network members</li> <li>• integration and coordination of services provided to network members</li> <li>• growth in knowledge content and use</li> <li>• high quality data</li> <li>• efficient data distribution and sharing mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>• organization-specific performance goals are met</li> <li>• efficiency improvements</li> <li>• operational improvements</li> <li>• resource acquisition</li> <li>• contribution to core organizational competencies</li> <li>• knowledge acquisition and learning</li> </ul>	<ul style="list-style-type: none"> <li>• individual professional goals are met</li> <li>• contribution to core professional competencies</li> <li>• knowledge acquisition and learning</li> </ul>
<b>Conditions for success</b>	<ul style="list-style-type: none"> <li>• <i>shared understanding of the domain and objectives</i></li> <li>• <i>competent leadership</i></li> <li>• <i>strategic similarity among partners</i></li> <li>• <i>ability to manage complexity</i></li> <li>• <i>diverse skills across the network</i></li> <li>• <i>attention to work processes and practices across partners</i></li> <li>• <i>suitable technical infrastructure for the network</i></li> <li>• <i>data and technical standards across partners</i></li> <li>• <i>knowledge-friendly culture</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>attention to organizational work processes and practices</i></li> <li>• <i>suitable technical infrastructure to participate in the network</i></li> <li>• <i>data and technical standards compatible with the network</i></li> <li>• <i>knowledge-friendly culture</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>professional reputation of network, partners and colleagues</i></li> <li>• <i>knowledge-friendly culture</i></li> </ul>

<b>Table 2c. Measures of Process and Relationship Success of Public Sector Knowledge Network with Associated Conditions for Success</b>			
<b>Level of Analysis</b>			
	<b>Network</b>	<b>Participating Organizations</b>	<b>Participating Individuals</b>
<b>Process &amp; relationship measures</b>	<ul style="list-style-type: none"> <li>• achievement of process goals</li> <li>• equity or “fair dealing” among participants</li> <li>• relationship strength (multiplexity)</li> </ul>	<ul style="list-style-type: none"> <li>• enhanced reputation or legitimacy</li> <li>• equity or “fair dealing” among participants</li> <li>• minimum conflict across membership in multiple networks</li> <li>• overall satisfaction with the network</li> </ul>	<ul style="list-style-type: none"> <li>• enhanced reputation or legitimacy</li> <li>• minimum role conflict across multiple networks</li> <li>• building of social capital</li> <li>• overall satisfaction with the network</li> </ul>
<b>Conditions for success</b>	<ul style="list-style-type: none"> <li>• competent leadership</li> <li>• ability to manage complexity</li> <li>• commitment to partnership</li> <li>• multiplexity of relationship</li> <li>• diverse communication methods</li> <li>• knowledge-friendly culture</li> </ul>	<ul style="list-style-type: none"> <li>• reputation of network and partners</li> <li>• multiplexity of relationships</li> <li>• willingness to share risks and benefits</li> <li>• diverse communication methods</li> <li>• knowledge-friendly culture</li> </ul>	<ul style="list-style-type: none"> <li>• reputation of network, partners, and colleagues</li> <li>• multiplexity of relationships</li> <li>• knowledge-friendly culture</li> </ul>

## Conclusions

Public sector knowledge networks address important challenges of public service and administration. Research on interorganizational relations, knowledge management, public sector networks, and e-government all contribute to our ability to understand the factors that are associated with PSKN success. Success is clearly not a unified concept, although certain success measures may be more important to some observers than to others. Success can be assessed at the network, organizational, and individual levels and subdivided into structural, performance, and process and relationship categories. Just as important, this research offers some explanation of the conditions that are conducive to success, again by parsing success into more specific levels and types.

This research offers a typology of public sector knowledge network success factors that may be useful in guiding future network research. Investigators might focus their attention more deeply on one category of success, or one level of analysis to test and improve the validity and robustness of this model. Combined with stakeholder analysis, such work could reveal what kinds of success are important to what kinds of stakeholders. It would also be very useful to determine whether there is a general hierarchy of measures or types of measures, or a temporal order in which certain kinds of success need to be achieved in order to attain comprehensive network success.

PSKN evaluations might also benefit from the typology by taking advantage of the cross-cutting dimensions to create manageable areas of focus with appropriate measures, metrics, timing for assessment and feedback into practice and resource allocation.

Practitioners can make use of the typology to help design PSKN's that have greater likelihood of success by giving attention to the conditions for success as well as the goals, methods, and relationships that compose the network and its operations. By conceptually breaking these immensely complex efforts into

more fundamental and familiar pieces, designers and managers of future networks might be more successful in achieving the public value that the networks are intended to serve.

## References

- [1] Agranoff, R. and McGuire, M. 2001. Big questions in public network management research. *Journal of Public Administration Research and Theory*, 11(3): 295-396.
- [2] Alter, C. and Hage, J. 1993. *Organizations working together*. Newbury Park, CA: SAGE Publications.
- [3] Anand, Vikas, William H. Glick and Charles C. Manz. (2002). Thriving on the knowledge of outsiders: tapping organizational social capital, *Academy of Management Executive* 16(1), pp. 87-101.
- [4] Barringer, Bruce R. and Jeffrey S. Harrison. (2000). Walking a tightrope: creating value through interorganizational relationships, *Journal of Management* 26(3), pp. 367-403.
- [5] Child J. and Faulkner D. (1998). *Strategies of cooperation: Managing alliances, networks and joint ventures*. Oxford, UK: Oxford University Press.
- [6] Davenport, Thomas H., David W. DeLong, and Michael C. Beers. (1998). Successful knowledge management projects, *Sloan Management Review*, Winter 1998, pp. 43-57.
- [7] Davenport, Thomas H. and Larry Prusak. (1998). *Working Knowledge*. Cambridge, MA: Harvard Business School Press.
- [8] Dawes, Sharon S. (1996). Interagency information sharing: Expected benefits, manageable risks. *Journal of Policy Analysis and Management*, 16(3), Summer.
- [9] Dawes, Sharon S. and Theresa Pardo, *Building Collaborative Digital Government Systems: Systemic Constraints and Effective Practices*, in Mc Iver, William and Ahmed K. Elmagarmid, *Advances in Digital Government: Technology, Human Factors, and Policy*. Kluwer, 2002.
- [10] DiMaggio, P.; and Powell, W.. (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48: 147-160.
- [11] Fisher, L. M. 1996. How strategic alliances work in biotech. *Strategy and Business*, First quarter: 1-7.
- [12] Freeman, R. Edward. (1984). *Strategic Management: A Stakeholder Approach*. Boston: Pitman.
- [13] Fountain, Jane E. 1998. Social capital: Its relationship to innovation in science and technology. *Science and Public Policy* 25(2): 103-25. (see Provan 2001).
- [14] Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology*, 91: 481-510. (see Lawrence)
- [15] Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choices in alliances, *Academy of Management Journal*, 38(XX), pp. 85-112.
- [16] Harbison, J. and P. Pekar. (1998). *Smart Alliances: A Practical Guide to Reputable Success*, San Francisco: Jossey-Bass.
- [17] Hill, C. W. L. (1990). Cooperation, opportunism and the invisible hand: Implications for transaction cost theory. *Academy of Management Review*, 15: 50-513.

- [18] Jain, Hemant, et al. (1998). Success of data resource management in distributed environments: an empirical investigation, *MIS Quarterly*, 22(1), pp. 1-29.
- [19] Jarillo, J.C. (1988). On strategic networks, *Strategic Management Journal* 9(xx), pp. 31-41.
- [20] Kumar, R., & Nti, K. O. (1998). Differential learning and interaction in alliance dynamics: A process and outcome discrepancy model. *Organization Science*, 9(3), 356-367.
- [21] Laumann, Edward O., and David Knoke. 1987. *The Organizational State. Social Choice in National Policy Domains*. Madison/Wisconsin: University of Wisconsin Press.
- [22] Mariolis, P. and Jones, M. J. 1982. Centrality in corporate interlock networks: Reliability and stability. *Administrative Science Quarterly*, 27: 571-584.
- [23] Mizrahi, Terry and Beth B. Rosenthal. (2001). Complexities of coalition building: leaders, successes, strategies, struggles, and solutions, *Social Work* 46(1) pp. 63-79.
- [24] Nooteboome, B., Berger, H., Noorderhaven, N.G. (1997). Effects of trust and governance on relational risk. *Academy of Management Journal*, 40: 308-338.
- [25] Oliver, Christine. (1990). Determinants of interorganizational relationships: integration and future directions, *Academy of Management Review*, 15(2), pp. 241-265.
- [26] Osborne, David and Gaebler, Ted. 1992. *Reinventing government: How the entrepreneurial spirit is transforming the public sector*. Reading, MA: Addison Wesley.
- [27] O'Toole, Laurence J. (1997). Treating networks seriously: practical and research based agendas in public administration. *Public Administration Review* 57(1): 45-52.
- [28] Pfeffer, J. and Salancik, G.R. (1978) *The external control of organizations: A resource dependence perspective* New York: Harper & Row.
- [29] Powell, W.W. (1990). Neither market nor hierarchy: Network forms of organizations, *Research in Organizational Behavior* 12(xx), pp. 295-336.
- [30] Powell, W.W., K.W. Koput, and L. Smith-Doerr. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41: 116-146.)
- [31] Provan, Keith G. and H. Brinton Milward. (1995). A preliminary theory of interorganizational network effectiveness: a comparative study of four community mental health systems, *Administrative Science Quarterly*, (40(1995), pp. 1-33.
- [32] Provan, Keith G. and H. Brinton Milward. (2001). Do networks really work? A framework for evaluating public-sector organizational networks. *Public Administration Review*, 61(4), July/August, pp. 414-423.
- [33] Putnam, Robert. 1993. *Making democracy work: Civic traditions in Modern Italy*. Princeton, NJ: Princeton University Press.
- [34] Raab, J. (2002). Where do policy networks come from? *Journal of Public Administration Research and Theory*, 12(4): 581-622.
- [35] Ring, Peter S. and Andrew H. Van de Ven. (1994). Developmental processes of cooperative interorganizational relationships, *Academy of Management Review* 19(1), pp. 90-118.

[36] Rittel, Horst W.J. and Webber, Melvin. 1973. Dilemmas in a general theory of planning. *Policy Sciences* 4(June): 155-169.

[37] Saxton, Todd. (1997). The effects of partner and relationship characteristics on alliance outcomes. *Academy of Management Journal*, 40(2), April, pp. 443-461.

[38] Scott, John. 1991. *Social Network Analysis: A Handbook*. London: Sage Publications. (See Provan & Milward 2001)

[39] Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications*. New York: Free Press.

[40] Williamson, O. E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, 36: 269-296.