

Policy Networks:

The relation between structure and performance

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To my Grandparents,

Gunvor Nyström and the late Harry Nyström
Antnäs

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ABSTRACT

The importance of policy networks and the need to treat networks seriously have long been emphasized within the field of policy science. However, not many attempts have been made to investigate the explanatory power of policy networks using the tools and theoretical concepts provided by social network analysis (SNA). This historical limitation is the central undertaking of the current thesis, which sets out to clarify the possible relationship between network structure and the organizing capacities and performance of policy networks. Not only is the aim to elucidate how different network qualities affect performance, but the thesis also has a methodological aim of indicating in what ways SNA contributes to and enhances policy network research.

Based on the theoretical concepts policy, networks, institutions, and social capital, an analytical framework is formed. A set of hypotheses regarding how network structures are believed to affect the performance of policy networks is suggested. Two particular network qualities—namely, network closure and network heterogeneity—are proposed as central for the process and its outcome. The former reflects the internal structure of a network in terms of density and centralization, while the latter reflects how the network is connected to other networks and addresses its level of diversity and cross-boundary character. The empirical part of the thesis consists of three case studies, in which policy processes within different policy sectors are studied. The empirical analysis confirms the existence of a relationship between network structure and performance. As the level of network closure increases, so does the capability to prioritize, thereby enhancing efficiency. However, the level of network heterogeneity is positively related to the function of resource mobilization, which, in turn, is a central prerequisite for improved effectiveness. The thesis concludes that a significant explanatory power exists in the concept of policy networks and that SNA is a promising way to explore its possibilities, enhancing policy research and the conceptual and theoretical developments within the field. Finally, the implications of the findings for contemporary policy making and public administration are discussed.

Keywords: *Governance, Policy analysis, Policy networks, Network structure, Network performance, Social network analysis*

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CHAPTER ONE

Networks and Governance

Networks and networking have become key concepts in both formal policy making and public administration. The same applies to the scientific community engaged in analyzing and evaluating policy making and its outcomes (Adam and Kriesi 2007; Bogason and Toonen 1998; Borell and Johansson 1996; Börzel 1998; Kickert, Klijn, and Koppenjan 1997; Marin and Mayntz 1991). The emphasis on networks is truly driven by an increasing complexity characterizing the modern state. Many societal problems are considered far too multifaceted to fit the problem-solving structures of traditional government. For instance, while borders between different levels of governmental units as well as different policy sectors are administratively defined, societal problems are characterized by their interdependent and cross-scale nature (Berkes 2002; Hanf and Scharpf 1978; Koppenjan and Klijn 2004; Scharpf 1991). As a result, the study of organizational mismatch between contemporary problems to be solved and related organizational structures assigned to cope with these has emerged.

Thus, the effectiveness of traditional weberian hierarchies, designed to manage the wicked problems of society and related dilemmas of collective action, are called into question. Instead, the establishment of networks, stretching beyond these formal hierarchies, is considered to be an imperative task for public administration. In addition, among policy makers, the creation of various kinds of collaboration networks are emphasized as an important strategy, necessary for the sake of realizing the aims of various policy programs (Bogason 1998; Hall and O'Toole, Jr. 2000). A wide range of factors promote this process in regards to networks and networking. "Devolution, rapid technological change, scarce resources, and rising organizational interdependencies are driving increasing levels of collaboration" (Thomson and Perry 2006, 20). The faith in centrally, generalized solutions in which the state and related government agencies play the central role in public policy making has thus decreased. Instead, development—whether it concerns social, economic, or ecological policies—

is assumed to be the result of a mutual interplay within inter-organizational settings of public as well as private actors.

The described shift implies a new role for the state as well as its many faces represented on different political administrative levels, both vertically and horizontally. This role is less concerned with the struggle to steer an unruly chain of implementation and more involved in policy making through the encouragement of cooperation between a set of actors. In other words, one can say that a significant part of formal public policy making today is somewhat paradoxical. The task seems to be how to create bottom-up structures or merge relevant actors in collaboration networks from the top.

The networks that emerge in relation to the processes of joint problem solving are sometimes, as indicated above, the result of deliberate strategy and political decision making. At other times, however, networks are of a more self-organized character, without any formal connection to governmental agencies or formal policy programs. Either way, societal problems are often addressed within these essentially cross boundary structures that involve participants from different levels as well as from different organizational units (e.g., Meier and O'Toole Jr. 2001). Such networks are frequently referred to as policy networks or “problem-specific entities, organizing a policy area by different forms of collective action” (Carlsson 2000a, 508). This understanding of policy networks is used in this thesis as well—as entities for problem solving, disregarding their formal relation to authoritative policy making. As such, this thesis aims to increase our knowledge about these networks and their problem-solving capacities (i.e., their “network performance”).

Within the scientific community, the reorientation toward networks and the significant attention ascribed to policy networks have been framed as a change from government to governance (Bache and Flinders 2004; Björk, Bostedt, and Johansson 2003; Bogason 2000; Hertting 2003; Pierre and Peters 2000; Rhodes 1996; Stoker 1998; Sorensen and Torfing 2005). The difference is believed to be significant. While government is associated with political-administrative hierarchy, governance is understood to be processes by which policy is produced within multi-actor structures

beyond formal hierarchy. “Governance is ultimately concerned with creating the conditions for ordered rule and collective action. The outputs of governance are not therefore different from those of government. It is rather a matter of a difference in process” (Stoker 1998, 17). The governance framework is broad and includes both empirical and normative notions of public policy making as well as analytical perspectives more focused on implications for policy research (Björk et al. 2003; Pierre and Peters 2000).

If governance is perceived as empirical phenomena, the concept of policy networks is used to describe specific forms of organizing structures of coordination. How these are, or might be, managed and controlled is a matter for discussion; however, an analytical approach to governance is more concerned with describing and explaining how and why policy is created. In this vein, the concept of policy networks is foremost considered an analytical tool, making possible the analysis of policy-making processes both within—and beyond—formal government structures.

In this thesis, the governance framework is used as an analytical approach for defining and studying the creation of policy making. However, the underlying aim of this line of policy research is to find ways to arrange more effective solutions to the problems in need for joint or collective action. Broadly speaking, the goal of this thesis is to contribute to this task by enhancing our knowledge of policy networks and how different network qualities affect the capacity of policy making. From this point of view, this thesis is anchored in and takes its point of departure from the governance discussion.

1.1 The Network Approach in Policy Science

The governance framework has its theoretical roots in organizational science, policy science, and political science (Bostedt et al. 2003; Klijn 1999). Within policy science, and especially within the field of implementation research adopting a bottom-up approach, the importance of network constellations in the study of political processes is far from new (Hjern 1987; Hull and Hjern 1982; Hjern and Porter 1997). The underlying presumption is that policies are formed within multi-actor structures or networks of collective action and that the varieties in outcome could best be

approached and explained according to the characteristics of these policy networks, the actors, and their relations. Generally speaking, the analytical vein of the governance framework is, on the whole, the policy network approach “reframed” (Pierre and Peters 2000, 50). Thus, both frames share the same fundamental ideas and distinguishing understanding regarding the nature of policy making that also underpin the logic of this thesis.

The bottom-up approach was originally formulated as a critique of a conventional policy analysis referred to as the top-down approach. The top-down approach incorporates a comprehension of policy making as a sequential process, whereby the implementation stage can be separated from the stage of policy formulation. Policy was generally defined as “a set of instructions from policymakers to policy implementers that spell out both goals and the means for achieving them” (Nakamura and Smallwood 1980, 13). Clearly this viewpoint expresses the assumption that policy is created within formal institutions—in other words, within structures of government. It is the comprehension of society as a complex, multi-actor society, sometimes even referred to as the “messy society”—in which the political power is diffuse and difficult to grasp—that has focused attention on the shortcomings of the top-down analysis (Carlsson 1996; 2000b). Resting upon the apprehension that one cannot presume the relevance of formal hierarchies or the distinction between policy formulation and policy implementation; the representatives of the bottom-up school have presented an alternative approach to policy processes: the policy network approach (Sabatier 1986). Policies are not decided, as indicated by the top-down perspective; they also emerge as people struggle to organize solutions to joint problems. Hjern and Porter (1997) use the term *implementation structure* to describe such networks.

Policy has been defined as “a set of ideas and the practical search for institutional arrangements for their realization” (Hjern 1987, 3). This way of perceiving political organization underpins the notion of policy networks as organized entities for problem solving, which has been adopted in this thesis. Thus, the bottom-up approach, as it is understood in this thesis, is a methodological perspective describing how to tackle the process of policy making analytically. As such, it should not be

confused with any ideas about how policy making should take place or how it does take place, the latter being a matter of empirical investigation (comparing the previous discussion of the governance framework to its empirical and analytical branches).

The governance framework has implications for how to perceive the concept of politics. The way of thinking about governance and policy, as presented above, makes the phenomena policy and politics conceptually intertwined. Politics is “a process whereby a group of people, whose opinions or interests are initially divergent, reach collective decisions which are generally regarded as binding on the group, and enforced as common policy” (Miller 1997, 390). Both the concept and the field of political science can be defined in either a broad or narrow sense (Hill 2005, 4). As this thesis adopts the broader perspective, the distinction between policy and politics becomes blurred. However, the democratic system has traditionally been understood with a clear dualism between politics and non-politics, between political decision-making and its implementation. Politics is, according to this narrow view, assumed to take place within formal hierarchical structures for decision-making (Montin 1998), a view comparable with the assumptions underlying the government framework and related top-down approach for policy analysis. Nowadays, a broader view has evolved, supporting the idea of a holistic relationship between politics and administration (Montin 1998). Thus, political processes are assumed to take place both within the area of political decision making as well as within the area of administration and within networks going beyond these formal hierarchies. Adopting this view, the field in which politics is created and policy produced is vastly extended, amplifying an expanded field for policy analysis within political science. These ideas are clearly implied by the shift from a focus on government to governance.

To sum up, the importance of policy networks is far from new; such an idea has long been emphasized by proponents for the network approach within policy science. However, recently such ideas have been reframed within the governance framework. This thesis is based on the assumption that policy is frequently created within such

networks. Therefore, to understand policy making and its outcomes, these should be studied.

1.2 The Explanatory Power of Policy Networks

Despite the significant attention given to policy networks, a limited amount of empirical research exists on network-level outcomes that explore in what ways certain qualities of policy networks affect processes of policy making and their outcomes (Adam and Kriesi 2007; Oliver and Ebers 1988). This thesis aims to address this issue. Thus, the thesis addresses a knowledge gap previously commented upon by scholars in the field of policy research. Critical voices have claimed that policy network research has been unable to move beyond a metaphorical usage of the concept of policy networks toward a coherent theory (Carlsson 2000a; Dowding 1995). The concept has been used as an analytical toolbox or as a descriptive metaphor to illustrate the general idea of a set of related actors engaged in various kinds of political activities, often on the macro-level. Rhodes and Marsh's (1992) typology of different network constellations is one example of this. However, although metaphors are heuristically helpful devices, they should not be treated as theoretical models capable of explaining change or outcomes (Blom-Hansen 1997; Carlsson 2000a; Dowding 1995). Indeed, research has been too macro-oriented and "insufficiently engaged in using network analysis to explain action and its consequences" (Raab 2001, 554).

Carlsson (2000a) argues that the concept of policy networks embodies a variety of different concepts and lacks in itself, any explanatory power. While the policy network approach points out the relevant unit of analysis, it does not provide any answers suggesting as what to look for, nor providing us with any ideas about the possible qualities of high versus more poorly performing networks. Thus, while the approach is useful, it does not offer any clear assumptions, or raise any specific hypotheses, about which variables that may explain differences in policy outcome and performance. For the sake of developing theory, research treating policy networks as an explanatory variable, with the ambition to outline what one would expect from different kinds of network arrangements is required (Carlsson 2000a). The metaphorical approach to policy networks is incapable of meeting this

assignment. Obviously, more is needed than claiming that networks matter. The challenging question is in what way they matter? Thus a research agenda mapping and analyzing policy networks in search for their explanatory power has been emphasized.

However, despite this lack of knowledge, research has progressed. We now know more about how certain types of networks affect performance (e.g., Daugbjerg 1998; Human and Provan 1997; 2000; Kriesi, Adam, and Jochum 2006; Meier and O'Toole Jr. 2001; O'Toole Jr. and Meiers 2004; Provan and Milward 1995; 1996; 2001; Provan and Sebastian 1998; Raab 2002; Schneider et al. 2003). These studies relate, in various aspects, to the central undertaking in this thesis. However, the ambition here is to advance our understanding further—namely, to comprehensively analyze network structure, organizing, and performance in policy networks of joint problem solving in different contexts. Some of the mentioned studies have applied the tools and theories of formal social network analysis (SNA). Foremost within this branch of research is the explanatory power of networks, which has also been described as having significant potential for the assignment of promoting policy network research (Adam and Kriesi 2007).

Originally, SNA emerged as a sociological method based on the idea that all life—political, social, and economic—could be perceived as social networks of relations, made up of interrelated units (i.e., actors or organizations) (Wasserman and Faust 1994, 3). SNA has been applied to various explanatory network models, relating network structure (i.e., the pattern of how actors within a network are connected and how relations are arranged) to various outcomes (see, for example, reviews by Borgatti and Foster 2003; Burt 2000; Flap, Bulder, and Völker 1998; Friedkin 1981). These studies, although not directly related to policy science, provide good examples of how networks—more specifically, their network structures—have been considered important. Applied to the idea of policy networks, the implications are that the characteristics of the actors, as well as the patterns of relationships among them, shape the context of and affect the process of policy making as well as what is being achieved. SNA, with its foundation in matrix algebra and graph theory, enables a quantification of the relations and makes possible the analysis of these networks

using quantitative measures. This opens the opportunity to elucidate the network structure of studied policy networks and relate these to the outcomes in order to search for explanations as to why some perform better than others. Evidently, SNAs potential for policy science is promising and needs to be further explored.

As such, Provan and Milward (1995; 2001) successfully moved the concept of networks beyond the metaphoric stage, deliberately addressing the issues of network structure and performance. With the help of SNA, they mapped and analyzed implementation structures in the community mental health system within the United States. Their study demonstrated that certain aspects of network structure—particularly, the degree of integration and related issues of coordination—are important variables related to higher performing networks. Thus, Provan and Milward brought the research on policy networks one step further by treating the networks as a variable for explaining outcome. However, the restricted amount of studies addressing these issues and the SNAs influence in the study of policy remain minor (Adam and Kriesi 2007). The task taken on in this thesis—namely, to investigate the relationship among network structure, organizing, and network performance—is believed to contribute to the task of filling this lacuna.

1.3 Network Structure and Network Performance in a Multi-Case Study

In this thesis, the relation between network structure and network performance will be studied by applying a multi-case study design. Three case studies of three policy-making process and related policy networks are conducted. All cases are situated in the Swedish context and concern policy making at the local level. The first case involves five networks, all concerned with the creation of new organizational units within the higher education sector, enabling multidisciplinary collaboration regarding research and educational matters. The second case represents a policy process and a network of political administrative actors working together with local entrepreneurs and universities in order to establish collaboration, fostering local economic development. Finally, the third case is a policy network struggling with the task of achieving collective action enhancing the adaptiveness of natural resource management. Disregarding differences, the studied networks are all concerned with

attempts to find new solutions and new processes to deal with, perhaps, old problems. They also converge in that they consist of essentially cross-boundary structures, constituted by a multitude of different actors, in need of collaboration and collective action. Further, within all these policy settings exists a normative stance, from formal authorities at the top, that the creation of cross-boundary networks is a necessity for whatever is defined as the overall goal. Studying these problem-solving networks will allow for the analysis of the relationship between network structure and performance.

The theoretical framework that will be presented in Chapters 3, 4 and 5 implies that differences in network structure, such as whether the network is integrated or fragmented and how it is connected to other networks, matter for policy making and its outcomes. Of course, a number of other aspects might be assumed to affect performance, such as external factors, content, and strategies. Although some of these will be discussed herein, it should be emphasized that in this thesis the policy networks will be discussed with a primary focus on their network qualities.

Accordingly, network structure is treated as the variable explaining the performance of policymaking. How might performance be comprehended? It has correctly been argued that the new forms of governance structures that are developing need to be evaluated using the same criteria that have been applied to the more traditional government structures. As formulated by Sabatier et al. (2005, 19), “these less visible forums must be evaluated according to the same criteria applied to democratic governance more generally [...] legitimacy, representation, and effectiveness.” Lundqvist (2004) has described the tension between these three variables as the “trilemma” of good governance. Although all three are vitally important to consider, this thesis is restricted to the issue of effectiveness, generally expressed in terms of the problem-solving capacities of the networks.

Network performance will be approached, studying both the internal and external effectiveness. While external effectiveness refers to the level of general goal fulfillment, the level of internal effectiveness, also termed *efficiency*, refers to the internal processes of the networks (see, for example, Abrahamsson 1993; Vedung

1997). In other words, while external effectiveness is about doing the right thing, efficiency is about doing things right (Ylinenpää 2007).

To return to the introduction of this thesis, a trend exists from government to governance, noticeable both within the area of formal policy making and within the scientific community addressing issues regarding how policy is created and how the process should be understood. The wicked problems of society and an ever-increasing complexity are important driving forces behind this development. Within the governance framework, policy networks are a social construct that have been ascribed significant importance, generally referring to structures of policy making beyond formal hierarchies. The overarching aim of this thesis is to address the explanatory power of the concept, exploring whether different types of policy networks can explain differences in problem-solving capacities. Empirical research on inter-organizational structures and policy networks have long been—and still is—encouraged (see, for example, Agranoff and McGuire 2001, 2004; Hanf and Scharpf 1978; Hanf and O'Toole Jr. 1992). In the article “Treating Networks Seriously,” O'Toole Jr. (1997) emphasized the importance of an empirical research agenda for a network approach when studying inter-organizational policy-making processes within complex policy areas. The current thesis is an answer to this request. Drawing upon previous network research, the network structure will be treated as the explanatory variable in a multi-case approach studying policy making within different areas. As such, it is believed that this study will provide insights about how the network structure of policy networks might be related to differences in performance. It is also expected to contribute to policy analysis by investigating the usefulness of social network analysis in this line of research. In short, this thesis is an attempt to “treat networks seriously.”

1.4 Aims and Questions

The increasing importance that policy networks have as been ascribed in public policymaking, the lack of systematic knowledge about these networks, and the possibilities provided by SNA constitutes the reasons and justification for this thesis. Addressing the explanatory power of policy networks is considered to be both a relevant and intriguing task. The overall aim can be formulated as follows: Can the

network structure of a policy network explain performance and is SNA a suitable tool for exploring this potential power? More specifically:

1. Does a relation exist between the network structure and the organizing capacities and performance of policy networks? If so, what kind of network qualities affect performance and in what sense?
2. Is SNA a valuable tool for policy analysis? Is the method capable of enhancing policy network research as well as supporting theoretical and conceptual development within the field? If so, in what way?

Thus, the aim of this thesis is to elucidate the relationship between network structure and network performance, using the technique provided by SNA. Drawing upon ideas regarding policy, networks, institutions and social capital, a set of hypotheses concerning the relationship between the two variables will be developed and tested empirically. Furthermore, the thesis has a methodological aim addressing the potential of SNA for policy science. The underlying ambition is to enhance understanding about policy making within contemporary society. Thus, in the end, the findings will also be discussed in relation to formal policy making and public administration.

1.5 Disposition

In Chapter 2, the research design and related case studies will be presented. The methodological choices and consequences for the adopted approach will be discussed, and the data collection procedure will be described. This discussion will be held on a general level since the more detailed descriptions regarding the procedures performed will follow in the introduction of each empirical chapter.

Thereafter, in Chapters 3, 4, and 5, the theoretical framework will be presented. By combining ideas of policy, networks, institutions, and social capital, the theoretical argument for why networks should be treated seriously and the issue concerning what to expect from different network structures will be discussed. These chapters will conclude with the formulation of a set of hypotheses concerning the relationship

between network structure and network performance. For this purpose the variables are operationalized—that is, given indicators and measurements, making it possible to find them and test their relevance in the empirical material.

Chapters 6, 7, and 8 constitute the empirical part of this thesis. Each chapter will address one case study. Given the similar structures, each chapter will begin with a short introduction, presenting the aim and the research design, followed by an empirical analysis and, finally, preliminary conclusions based on each set of data.

Finally, in the concluding Chapter 9, a comprehensive analysis of the generated findings of each case study will be conducted. The relationship among network structure, organizing, and performance, as well as implications for policy science, formal policy making, and public administration, will be discussed. Ultimately, the discussion will address whether the network structure of a policy network can explain performance and whether SNA is a suitable tool for exploring this potential power.

CHAPTER TWO

Methodological Considerations and Data Collection Procedures

This chapter will discuss several general methodological considerations. For example, the adopted view of policy networks as problem-solving structures leads to certain consequences, especially for the definition of an analytical unit. Although the processes of data collection applied in all three case studies have diverged in some aspects, common themes are evident, such as perspectives and tools that have been applied in all three settings. Thus, the topic of this chapter is how to proceed in order to map and analyze policy networks. The approach adopted will also be related to the discussed top-down and bottom-up methodologies. However, first, the research design and the empirical cases will be presented as well as an explanation of the basic logic behind the analysis.

2.1 Research Design

In order to answer the questions of this thesis, a multi-case study design that incorporates the study of policy networks and related processes within three different policy areas is performed. The logic of the design is based on analytical or theoretical generalizations.

Case study sampling is theory-driven. Given the aim of making theoretical generalizations, each case should serve a specific purpose (Miles and Huberman 1994). When resting upon the logics of multi-case study research, the variations between the cases and the reasons for those variations are the criteria that guide the selection of cases and the consequent interpretations relating the findings to theory. The sampling of cases should follow some replication logic, either by choosing cases that produce similar results (literal replication) or cases generating contrasting results, but for an expected reason (theoretical replication) (Yin 1994). In using the logic of

replication, the aim is to secure external validity, which refers to the possibility to produce generalized knowledge about the phenomena in focus (Yin 1994). This procedure of sampling can be compared to that used in a more quantitative approach, where randomization as well as sampling and generalization to population rule. The cases of this thesis are selected with these ideas as a frame of reference. The research design is based upon three independent, but still analytically interrelated, case studies and is presented in Figure 2.1

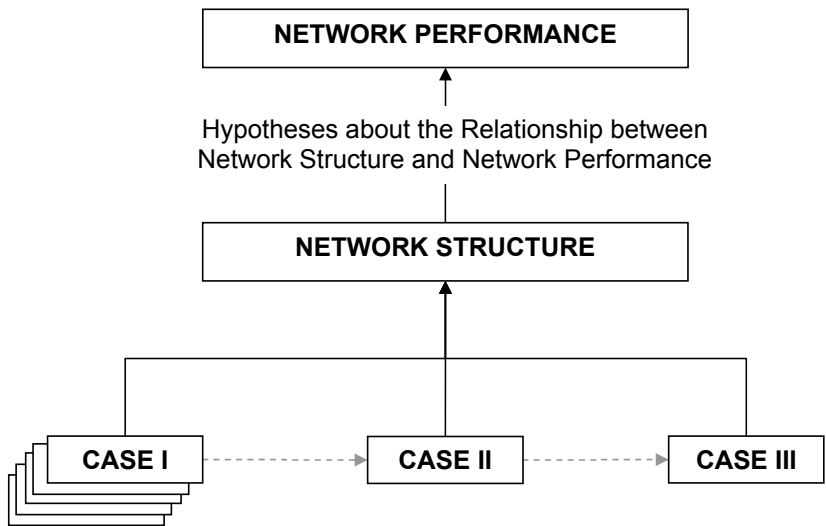


Figure 2.1. The Research Design

2.1.1 Case I: Policy networks for new knowledge areas within the higher education sector

Case I is a study of five networks situated within the policy sector of higher education. The study is to be regarded as embedded multiple case studies since each case holds more than one unit of analysis (Yin 1994). The basic logic of comparison is used to analyze the data sets (Denk 2002).

The five networks are related to the realization of a local strategic policy program aimed at establishing new multidisciplinary organizational units for education and

research within a Swedish university. Although given the same formal prerequisites, some of these networks have been very successful in creating new knowledge areas whereas others have experienced problems or even failed in their mission. The initial question asked is why this is so and does success and failure relate to variations in network structures?

The networks in Case I are intra-organizational structures as the organizing essentially takes place within the university. However, the strong emphasize on multidisciplinary collaboration and the fact that the networks cross departments and divisions within the university make it proper to regard them as cross-boundary. Case I is relevant for the purpose of this thesis since its context essentially encompasses the central features of a complex policy setting, a terrain in which networking is believed to be a common element. Using the education system as an example, Weick (1976) described the complexity of modern policy areas by labeling them as “loosely coupled systems” in which the actors involved in the policy process are many and the responsibility often widely spread. The sector of higher education is a good illustration of this since its rapid expansion and the characteristics of a multi-actor arena and multi-level policy making are distinctive features (Bauer, Askling, Marton, and Marton 1999; Marton 2000). Given this, it is believed that the networks of action discussed in this case are relevant for policymaking within other policy areas as well encompassing the same features.

2.1.2 Case II: A policy network for local economic development

In Case II, the findings and hypotheses from Case I will be further tested and developed in a different context and on a higher, inter-organizational, level. Case II represent a study of one policy network—often referred to as a Triple Helix network in the literature—bringing together actors from different sectors of society: more specifically, the political, the academic, and the commercial sectors (Etzkowitz and Leydesdorff 2000; Etzkowitz 2005). The case and the presumed purpose of the studied network collaboration focus on establishing a research station and related School of Research for regionally based knowledge production. However, the long-term goal is to achieve and promote local economic development within the region. The case is an illustrative case that reflects a policy process related to a policy

program in which the solution of a designated problem is thought to be found within integrated, cross-boundary networks. The case can be understood as an inter-organizational network that has to cope with all the problems that come with such policy making.

2.1.3 Case III: A policy network for adaptive resource management

Case III is a study related to the field of natural resource management; more precisely, it constitutes a co-management network. Co-management is only one of many concepts describing multi-actor institutional arrangements crossing different levels of scales, sectors, and hierarchies involved in natural resource management (Carlsson and Berkes 2005; Olsson, Folke, and Berkes 2004; Plummer and FitzGibbon 2004; Walters 1986; 1997). Within this branch of literature is an evident normative stance that sustainable resource use is dependent upon the creation of such kinds of networks, just like economic development is thought to be dependent upon the triple-helix collaboration and multidisciplinary is encouraged in order to improve the quality of higher education.

The policy network of this case study encompasses the actors involved in the rule-forming activities governing a fish management area. While Cases I and II analyze newly developed networks, Case III represents an already existing structure. Consequently, the institutional arrangement for problem solving that is being investigated in this third and final case study is believed to reflect a well-established policy network. Altogether, this makes it suitable for the task of testing and refining the accumulated knowledge that presumably will be gained from Cases I and II.

2.1.4 Common Features of the Cases

Despite obvious differences, the studies presented herein share some common features. In the introductory chapter, they were described as essentially cross-boundary, multi-actor networks in need of collaboration and collective action. It was also stated that they are concerned with attempts to find new solutions and new processes through joint problem solving. In the literature on policy networks and network evolution, a recurrent assumption is that network collaboration stands for something new, enhancing innovative solutions. Thus, the comprehension that these

types of networks are useful in promoting is another shared commonality for the context of the three case studies. In a way, the networks could be regarded as innovative processes. Innovation is frequently used in social sciences relating to “all the ideas, lines of actions or objects that are perceived as new” (Borell and Johansson 1996, 33, own translation). Research on innovative systems, innovations, and innovative processes constitute a substantial proportion of the research in the fields of networks (Innovativa Processer 2003). Acknowledging that the term *innovation* is far more complex and that it constitutes a research field of its own, simply expressed, to innovate is to introduce something new. An innovative process might be described as “an activity over time that produce originality, complexity and action itself or in its result and that is based upon a certain knowledge base” (Innovativa Processer 2003, 320, own translation). All three case studies in this thesis might be regarded as attempts to establish innovative policy networks.

In addition, the three case studies complement one another. Both their common features as well as their differences touched upon in the earlier case descriptions enhance the design. The research process, as such, has also been characterized by a continuous learning, since each case study gives rise to new ideas that can be applied to the next (which is illustrated by the soft grey arrows connecting the cases in Figure 2.1). Apart from the empirical analysis that will conclude each case study, a comprehensive analysis based on the logics of theoretical generalization will be performed in the concluding chapter in order to identify common themes and findings. Thus, the intriguing question is whether a connection exists between the variables—namely, network structure and network performance—independent of context.

2.2 Defining the Analytical Unit

The relationship between network structure and network performance will be investigated using a multi-case study design. One decisive issue is how the analytical units should be defined and delineated. What is the actual essence of policy networks and how should these be understood in the empirical context? This discussion relates to the methodological implications of adopting either a bottom-up or a top-down perspective to policy analysis. This thesis departs from the perspective on policy

networks launched by the bottom-up school. However, the design also incorporates elements that could possibly be more associated with a top-down approach.

A social network is “a set of players and a pattern of exchange of information and/or goods among these players” (Annen 2003, 451). Thus, a policy network consists of the actors, and their relations, involved in the process of policy making. However, what is a policy making process? The bottom-up definition of policy is adopted in this thesis, considering policy to be “a set of ideas and the practical search for institutional arrangements for their realization” (Hjern 1997, 3). A common interpretation of both implementation structures and policy networks is declared, essentially perceiving them as problem-solving structures working for joint solutions or ends. Essentially, the making of policy reflects organizational processes that occur within networks of collective action—that is, “actions taken by members of a group to further their common interests” (Bogdanor 1987, 113). Organizing implies the “division of labour into various tasks to be performed and the coordination of these tasks to accomplish the activity” (Mintzberg 1979, 2). In other words, policy networks can be perceived as the sum of the organizing activities searching for and representing institutional arrangements of problem solving. With this assumption as a point of departure, the policy networks are defined and mapped empirically. Previous implementation research has suggested that the policy process, for analytical reasons, might be ordered and captured using a set of organizing functions—namely, problem definition, prioritizing, resource mobilization, and finally evaluation (Carlsson 1993; Hull and Hjern 1987).

The basic idea is that all types of organizing as well as policy making require the involved actors to agree as to what the problem to be addressed is. Given that numerous alternative ways of solving a specific problem exist, prioritizing is essential. Only if actors are endowed with an infinite amount of resources can prioritizing be neglected. To devise solutions to identified problems or challenges, resources are needed and must be mobilized. These might consist of information, financial means, or more intangible goods, such as knowledge or legitimacy. In addition, the mobilization of resources is an intricate activity that must be organized; part of this organizing process is dependent upon some internal perceptions of

performance, such as evaluation or follow-up. The actors in a particular policy setting presumably need to know that their activities advance their joint effort and whether they reach or come closer to their desired goals. This must also be addressed when organizing a solution to a problem. Thus, all of these functions have to be performed and coordinated to form policy networks.

Thinking about the policy process as the sum of those organizing functions, the process is easier to grasp and the policy network or those actors involved more possible to map empirically. Therefore, with these methodological assumptions as a point of departure, the analytical units (i.e., the policy networks) can be identified by looking for those actors who have taken part in the activities described. Thus, for the sake of finding a policy network, several questions have to be asked: What is the problem to be solved and who has taken part in the process (Carlsson 1996, 535)? Who has been involved in the process of problem definition? What set of actors determine the priorities, etc.? This is also how the analytical units are empirically defined in this thesis, inspired by the bottom-up approach to policy network research: by mapping the unit while disregarding formal hierarchies.

Thus, the analytical unit is defined starting with a policy problem. A top-down approach would define the analytical unit as those actors formally connected to the implementation of an authoritative defined policy problem (Sabatier 1986). A bottom-up approach deviates from this perspective by putting the problem-solving capacities of the policy networks in the focal point (Carlsson 2000b, 208). As set by the researcher, the policy problem structuring the research is defined by disregarding the existence or formulations of certain program goals. It is important to take into account that policy networks are analytical constructions, dependent upon how this research problem is defined.

The formulations of the basic research problem focusing the investigation of the three case studies that make up this thesis diverge. While the first case is about the realization of new units for education and research programs, the second network focuses on the establishment of regionally based research activities. The third network has formed around issues concerning adaptive fishery management. Relating

to the discussion regarding the different methodologies previously outlined, it can be stated that, although the design has its base in and is mainly inspired by the bottom-up school of research, it might be comprehended as containing elements of both perspectives. For example, in Cases I and II, the analytical demarcation of the policy processes do in fact correspond with the overall goal formulations of authoritative policy makers. To further exemplify, the policy networks in Case I are mapped according to who has taken part in the realization of new knowledge areas—a goal expressed in the local policy program. A grounded bottom-up study would perhaps instead have focused on the networks solving problems of a strategic character, disregarding their relation to the directions formulated in the local policy program. As such, perhaps it is proper to say that this thesis mixes the top-down and bottom-up methodological approaches. Chapter 5, operationalizing the performance variables, will return to this discussion regarding the different approaches.

2.3 Snowballing Interviews

Two variables—network structure and network performance—are central for this thesis. Data concerning these two were collected in two stages, applying both qualitative and quantitative methods.

The policy networks are inductively identified through the use of the snowballing interview technique. The basic idea of this technique is to define the population inductively, by letting the actors nominate one another (Miles and Huberman 1994, 28). This phenomenological approach, in which the structure defines itself, elucidates the relevant actors involved in a policy process regardless of formal hierarchies and organizational boundaries. Who has participated and who has not is elucidated as a result of empirical investigation (i.e., an applied bottom-up technique).

The snowballing within each network started with a few persons, known beforehand to be deeply involved in the work. These persons were interviewed using semi-structured interviews around the organizing functions described in the previous section (see Appendices B, D, and F). The respondents were asked to describe the processes and with whom they have communicated concerning, for the case in question, the relevant issues. The criteria for being involved as an actor within a

certain network are thereby defined by the respondents. The interviews were carried on with new respondents within each network until nothing new was said, meaning that the stories told by the respondents did not contribute to or change the overall picture of the process and no new actors, given any central importance, were mentioned. If a person was assigned a marginal function for the work or if it could be assumed that the person would not tell a different story or add to the list of actors, no contact with this person was made. Although an ideal situation would entail interviews with all persons being mentioned; given the available resources this was not possible. Still, the number of interviews conducted is considered sufficient for the purpose of learning about the processes and defining the actors of the policy networks.

However, the snowballing method combined with a network approach might have some limitations. Problems commonly mentioned in the literature include the impossibility of locating isolated actors. As a matter of fact, whole subgroups of actors might be ignored, depending upon where in the structure the researcher starts snowballing (Hanneman 2004). These weaknesses, which in some research designs are vitally important to acknowledge, are not considered to affect or weaken the design of this work because the theoretical assumptions concerning the nature of policy networks ensures that the relevant unit of analysis (i.e., the policy producing structure) will be connected and not isolated. It is assumed that all relevant actors who have participated in the process will be identified by other actors and thereby connected by a link. Consequently, unconnected persons have not really participated in any of the organizing functions and are therefore not to be regarded as actors in the process of policy making.

When reconstructing a process, the risk that people forget or rationalize their behavior is obvious. Thus, one possible weakness with the interview study is that, in some cases, a long period of time—in one network, two years—have passed since the processes started. However, the fact that many actors have been heard reduce this shortcoming. After the interviews were conducted, all stories are analyzed in order to gain an overall comprehension about the processes.

To conclude, the interviews upon which this thesis is based have generated qualitative data about the policy processes within the networks related to the case studies. As such, rich descriptions and information about the organizing capacities and performances of the networks were gained. Yet another result was that one essential feature of the social networks—the participating actors—was identified.

2.4 Social Network Analysis

Once the actors are identified, the relations among them are to be disclosed, thereby enabling social network analyses. For this purpose, a questionnaire was sent to every actor mentioned during the interview studies. The questionnaire contained a list of all the names, and each person was asked to mark every other person with whom they had communicated regarding certain issues (see Appendices C, E, and G). Three to four reminders were sent out to the respondents. This kind of survey has been frequently used in studies applying SNA.

The questionnaires were designed after a careful analysis of questionnaires used by other social network researchers and with guidance found in the methodological literature on SNA. A rich variety exists concerning how social networks have been defined, mapped, and analyzed, depending upon both the area of research and the theoretical perceptions regarding the nature of the interactions (Cross 2004; Marsden 1990; Scott 2000; Wasserman and Faust 1994). Within social sciences—especially when it comes to studies concerned with, for example, links of influence or cooperation—the relations are often framed as some kind of communication links. In Provan and Milward's (1995) study, the relations consisted of communication patterns, indicating cooperation among different agencies. Moreover Friedkin (1980), when studying scientific cooperation, focused on the communication flow, asking respondents to indicate the persons to whom they talked in relation to work issues. In the current thesis, involvement will be indicated by existing links of communication about issues pertinent to the policy processes under study.

As mentioned earlier, the questionnaires contain a list of all persons mentioned during the interviews. The lists of names were constructed with the logic that it was better to include too many than too few. Therefore, some questionnaires included

names frequently appearing in documents of various kinds, such as meeting protocols and address lists. The decisions as to whether these persons are to be considered actors or not were left to the respondents answering the questionnaires. The advantage of this line of action is that it verifies that a relevant set of actors is included. However, the disadvantage is that the list of names gets longer, requiring more effort on the part of the respondents to answer it. The respondents were also given the opportunity to add to the list of names themselves. Research has shown that sociometric questions with open choice designs have a higher reliability than others (Wasserman and Faust 1994). Based on this experience, the design was left open for additional names to be added.

Another significantly more difficult problem associated with the collection of social network data is the accuracy of the information given by the respondents (see Marsden 1990 for a neat yet comprehensive discussion about the challenges associated with social network data). Can one really trust the information given by respondents when answering questions concerning their relationships? Extensive work done by Bernard and Killworth (1979) has addressed the issue of information deficit by comparing observed interaction with verbal reports. Their results were rather discouraging. Approximately 50 percent of the information did not correspond with the observations. More recent studies, conducted by Freeman, Romney, and Freeman (1987) for example, show that information accuracy depends upon certain factors, such as the type of relations being questioned. Although people might forget or not be able to report on certain situations, they seem to be correct in reporting what normally happens (Wasserman and Faust 1994, 57). For example, if one asks respondents to name persons to whom they have talked during the past week, they will give the names of the people with whom they normally discuss work during an average week.

Thus, the strengths of the relationships seem to matter for the validity of sociometric data. The level of the so-called tie strengths is a “combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (Granovetter 1973, 1371). It has been argued that the relationships people fail to recall are the weaker ones, while questions referring to the

more stable connections have higher reliability (Marsden 1990). Since it is usually this more stable structure of relations that is of interest for a policy network researcher, this reporting deficiency is not as problematic as it might seem at first. Still, it restricts the possibility of gaining information about sporadic contacts and more superficial relationships. Although methodological problems exist that are associated with sociometric questions, there are also ways to deal with at least some of them. Asking questions concerning the more stable interactions, covering shorter time frames, and specifying the questions as much as possible are tested ways to increase the validity of social network data (Bell, Belli-McQueen, and Haider 2007). Still, issues such as the risk of respondents interpreting the questions differently and the risk of the respondents neglecting to answer or answering the questions in an accurate way are of course difficult to avoid in every research design, including this one.

2.5 Processing and Presenting Social Network Data

Social network data is vulnerable for missing data; the absence of reports from just one or a few central actors might in fact distort the dataset and result in serious misinterpretations. However, given the high response rates gained in all three case studies, ranging from 85 to 99 percent, this is not considered problematic for the analysis herein.

The social network data collected for the purpose of this thesis have been processed and analyzed with the help of UCINET6 (Borgatti, Everett, and Freeman 2002), software commonly used for social network analysis. The data were imported into UCINET6 creating DL files. The data set generates a matrix of asymmetric data (i.e., the ties are directed and might or might not be reciprocated). Each relationship indicated by the respondents is given the value of 1. The visualizations of the networks are carried out in another program called Netdraw (Borgatti 2002). To help with some of the calculations regarding actor attributes and cross-boundary interactions, the data (in Cases II and III) were also processed and run through a database created in Microsoft Access.

In some of the case studies, data on both stronger and weaker connections have been collected. Empirically, tie strength might for example be captured by the frequency of interactions. In some case studies (Cases I and II), data concerning both occasional and several discussions were collected. However, in the later stage of data processing, only the stronger ties, representing a higher frequency of communication, were used in the analysis for two main reasons. First, the more frequent interactions are known to more properly reflect the underlying and stable network, which might be assumed to better reflect the institutional arrangements of policy networks, affecting both the actors and their interactions. Second, as previously discussed, data on these kinds of ties suffer from a lower level of report deficit than the weaker ones. More detailed information about what kind of data has been collected is to come in the empirical chapters. The continuous learning characterizing the work with this thesis has created a situation in which the data collection procedure has been refined and adjusted over time. The SNA outcome typically results in visualizations of the networks and reports about quantitative network measures, describing their structural properties. The concepts and measures used to describe these structural qualities have been derived from the literature on SNA and will be presented in Chapter 5. In order to ensure the anonymity of the respondents, the networks are largely impersonalized. Since the aim of this thesis is to generate knowledge on an abstract and general level, this line of action is not thought to have any negative effect on the analysis and forthcoming discussion.

Finally, an important limitation of the network data in this thesis has yet to be mentioned. The datasets do not show the network dynamics or the evolution of the structures; they also do not demonstrate how the networks looked at different phases in the process or how the structural qualities changed over time. The data provide one picture of the social network, reflecting the whole process. However, some information regarding these issues is still available from the qualitative interview data. In this thesis, the quantitative and qualitative data are complementary.

2.6 Combining Qualitative and Quantitative Data

Yin (1994) underlines the importance of data triangulation, stating that the use of multiple sources of evidence is important for the construct validity. The concept of

construct validity refers to the relevance of getting correct operational measures for the phenomena studied. It is generally suggested that the researcher apply multiple measures to understand the same phenomena (Yin 1994). The use of multiple sources of data and a combination of qualitative and quantitative analysis are taken into consideration in this thesis.

The data collection procedure applied in this thesis combines the advantages of qualitative as well as quantitative information. Networks are often mapped and analyzed using either one or the other. Most projects use questionnaires to collect sociometric data (Wasserman and Faust 1994). This approach, although common, would not have been functional for the current work since the issue of to whom to turn could not be determined in advance. Therefore, a qualitative snowballing interview technique had to be used to serve the purpose of identifying the central actors. This combined procedure essentially improves the validity.

Moreover, the formal, quantitative data obtained from the questionnaires offer many other advantages. It would have been difficult to collect the relational data solely from the interviews. First, people might forget to mention some of their important contacts. Second, the questions might be asked differently during each interview session, making the process more vulnerable to interview effects. These shortcomings are more properly handled through the use of a questionnaire.

The use of both approaches improves not only the data collection procedure, but also the analysis. Each person can tell the story only from his or her viewpoint; the respondents can only see the network from their existing place in the structure. The quantifications of the relationships and the graphical visualizations enhance the analysis of the overall network qualities. Qualitative data, on the other hand, are very important for the design in order to validate the interpretations made based on the quantitative data. Qualitative data contribute by building theoretical bridges between the quantitative network measures and the characteristics of the policy process, refining the relation between the network structure and performance. These important ambitions would be left unfulfilled without access to rich qualitative descriptions. Finally, although SNA generates quantitative measures, these have to be subject to

careful interpretations by the researcher. As such, an interpretative approach is adopted in this thesis.

This section concludes the introductory part of this thesis. The relevance of the research topic, the aim and questions, the research design, and several methodological issues have been introduced and discussed. In the three subsequent chapters, the nature of policy networks and their role in policy making will be addressed, forming a theoretical framework guiding the underlying ambition of this thesis: to treat networks seriously.

CHAPTER THREE

Policy Networks as Explanatory Variables

This chapter introduces the theoretical framework. The nature of policy network relations and their potential as explanatory variables in policy analysis are explored. Why should the relations, or—more specifically—the pattern of relations among a group of individuals, be given such a central position in social theory? In other words, what are the theoretical arguments for treating networks seriously, proposing that network structure matters? To answer these questions, the adopted network approach must be combined with theoretical ideas regarding the policy networks in focus. In this thesis, ideas drawing upon purpose action, bargaining, institutions, and processes of institutionalization will lay the foundation needed.

3.1 Networks of Purposive Action

The evolvement of policy networks is an expression of purposive action taken by self-interested individuals. The central role ascribed the individual in the formation of political processes springs out of the rational choice school of thought in which the methodological individualism is a distinguishing element (Moberg 1990; Udehn 2002). In ontological terms, individuals are all there is to reality. Only individuals can act and create meaning; therefore, society is neither more nor less than the sum of these. In epistemological terms, methodological individualism implies that the individual is the proper analytical unit as all social phenomena can be reduced to individual action¹. Accordingly, the actions taken and choices made on an individual level are central for research within the frame of this approach. Rational choice theory also assigns the actors certain preferences and the capacity to reflect upon different alternative strategies in order to choose proper action (Moberg 1990).

¹ Characterizing for the epistemology associated to the rational choice approach is also the positivistic ideas: the search for an objective truth, model construction, and hypothetical testing for predictions (see, for example, Moberg, 1990).

Viewed from a strict rational choice approach, policy networks are mere aggregations of individuals and should not be considered important analytical units in themselves.

However, large variations exist within the rational choice paradigm. These concern the determination of preferences and the actors' ability to calculate and choose proper actions in order to satisfy these; the variations also concern how action is affected by assorted structural (broadly referring to other social and contextual) factors. Although the purposive nature of action constitutes the foundation of the theoretical framework guiding this thesis, it does not imply that all individuals are driven by the same kinds of purposes; neither is complete rationality (as described earlier) assumed. Thus, the imaginary actor *homo economicus*, driven by materialistic self-interest and the possessor of complete information and knowledge and often associated with neo-classical economic theory, is not suggested.

Clearly, political activity and networking are more than material motives and perfect calculations regarding benefits and costs. Other social variables, such as the cultural context, established norms of behavior, previous experience, and the assumed behavior of others, affect the mental models of the individuals, forming their preferences, purposes, and strategies channeled in policy-making processes (Ostrom 2005). The rich complexity of motives and specific purposes guiding the actors must be acknowledged theoretically and the actual preferences at force in the policy process found empirically.

Action might in fact be the result of misinterpretations and lead to unintended consequences. The concept of bounded rationality, launched by Simon (1957) and now a widely applied idea, acknowledges constraints related to an actors' capability to collect and process information in decision-making situations. Individual action is constrained by, for example, existing knowledge and cognitive capacities framing the calculations and, thereby, the choices made. Thus, in this thesis, the rational individual is considered as the basic building blocks of policy networks, yet rationality is understood to be reflected in the attempt to fulfill existing goals, neither in the essence of the goal nor in its actual fulfillment. People do what they consider to be best regarding their purposes in the process of policy making.

Actors have purposes; still, they do not necessarily share these with others. The existence of preferences or goals in common is not a necessary condition for policy network evolvement. Networks evolve because the participators need one another. Presumably, the actions forming policy networks either spring out of the urge to gain or maintain valuable resources. Lin (2001a) uses the terms *expressive* and *instrumental* action, claiming that the latter is the main driving force behind networking. Network linkages function as resource providers. As such, networking is a matter of resource exchange—that is, “a series of interactions between two (or more) actors in which a transaction of resources takes place” (Lin 2001a, 143). Both material and immaterial resources are exchanged within policy networks. As suggested by Scharpf (1978), it might be a question of money as well as knowledge, information, and legitimacy. This ongoing exchange of resources results in a prevailing state of interdependency among the involved, acknowledged as the basic foundation of inter-organizational theory. Powell (1990, 303) captures this idea: “A basic assumption about network relationships is that one party is dependent on resources controlled by another and that there are gains to be had by the pooling of resources.” Policy networks are reflections of this interdependency.

Thus, resource exchange links actors horizontally across different sectors or organizations and vertically across different levels of authority in networks of action. The state of mutual dependency that comes out of this process is important to consider when struggling to understanding policy networks. Dependency situations do not necessarily have to be symmetrical. On the contrary, and as emphasized by Lin (2001a), the actors might be hierarchically related to one another depending on the resources they hold or can get a hold of. The common misconception about networks, presuming a flat structure (by definition), must be dismissed. Although the actual differences in authority might not be expressed in or correspond to any formal organizational schedule, this should not lead to the interpretation that the distribution of power and influence is equal. On the contrary, this is rarely the case. Thus, not only political administrative entities can be hierarchical, but policy networks might also possess this quality. What is important, referring back to the bottom-up perspective, is that this issue must be determined empirically.

3.2 Networks as Bargaining Games

The processes of resource allocation within policy networks are frequently described in terms of bargaining games (Rhodes 1992; Thatcher 1998). This perspective is also quite compatible with the principles underpinning the model of implementation presented by Elmore (1993). According to this model, bargaining is the most vital component of all organizing activity. Based on this model, implementation (or policy making) can be described as a multifaceted process characterized by elements of both conflict and bargaining. Conflict is the result of the actors' purposive ambition to maximize their advantage and utilize the desirable resources, while bargaining comes out of the state of collective interdependency discussed in the previous section. This bargaining feature of policy making is also emphasized by Coleman (1990), who considers social action to be a negotiating process in which actors, constrained by their existing resources and driven by their pursuit to maximize their interests, interact. It is a matter of giving and taking, and the success of individuals depends upon the resources they possess as well as the recourses held by others and the strategic and social context constraining their opportunities. Thus, action within policy networks is significantly contextual and strategically. In other words, social action "involve[s] the selection of objectives and the search for the most appropriate means to achieve those objectives within a particular context at a particular moment in time" (Hay 1995, 190). This insight emphasizes a network perspective.

Despite obstacles such as those represented by divergent problem definitions or opposite interests, collective action—"actions taken by members of a group to further their common interests" (Bogdanor 1987, 113)—and decision-making do take place within these organized entities. These processes are the result of the actors' ability to adjust and adapt to one another. A distinguishing feature of networks is that this convergence, so vital for the process to continue, might occur despite the absence of formal hierarchical control (Lindblom 1965). It is rather a matter of mutual adjustment. Thus, relational aspects constrain the policy process, making it proper to talk about relations of power in the struggle over resources (Dahl 1969)². The results of the bargaining procedures do not necessarily reflect the most preferred situation

² The relational aspect of power is stressed by Dahl (1969, 80), who states that "A has power over B to the extent that he [or she] can get B to do something that B would not otherwise do."

for any of the actors involved (Elmore 1993) due to the bounded rationality of the actors and the relational character of the process. On the contrary, all actors might, in fact, be dissatisfied with what is achieved. However, because of the prevailing state of interdependency, the very preservation of the process can, in itself, sometimes be considered a success for the involved (Elmore 1993). Adopting a network approach to policy analysis, the realization of collective action or the establishment of a common purpose, is often considered the success criterion for evaluation (Kickert et al. 1997). However, certain actors, or certain subgroup of actors, might hold more bargaining strengths than others (Cook 1977; Ensminger and Knight 1997), and might therefore be more successful in affecting the interactions to their advantage. In a discussion on power and social networks, Knoke (1990) distinguished between two dimensions of power, influence and domination, by forming four different categories. Although domination is present in relationships in which one actor is in control by “offering or withholding some benefit or harm,” influence is exercised “when one actor intentionally transmits information to another that alters the latter’s actions from what would have occurred without that information” (Knoke 1990, 3-4). In reality different forms of power coincide and might be difficult to hold apart empirically. Thus, Knoke’s central argument is that social networks reflect these relations; when made visible, they reveal existing power situations.

Proponents for a network approach stress that policy outcomes are highly dependent upon how these bargaining processes proceed. The actors as well as their motives and expectations influence network performance; however, the outcome is also dependent upon the way in which their interactions precede. “In network forms of resource allocation, individual units exist not by themselves, but in relation to other units” (Powell 1990, 303). Obviously, this perspective departs from the orthodox versions of rational choice and the strict methodological individualism as the ongoing web of bargaining interactions within these policy-producing structures is considered important to acknowledge when explaining policy outcomes and variations in performance. In this thesis, policy networks are therefore believed to be something more than mere aggregations of individuals and are thus considered important analytical units by themselves.

3.3 Policy Networks as Organized Entities: Reflecting institutional arrangements

All models that try to capture social life inevitably end up in ontological and epistemological discussions regarding the agency-structure debate (Alexander et al. 1987; Giddens 1984; Hay 1995; Peters 1999; Wight 2003), where the term *structure* very broadly refers to various social and contextual factors. The debate has already been touched upon in the earlier discussion about the shortcomings of the rational choice approach. The controversy has also been the topic for a debate regarding the theoretical basis of policy networks (Evans 2001; Marsh and Smith 2000; 2001; Raab 2001; Toke and Marsh 2003). On what level could social phenomena best be approached? Is the outcome of policy making dependent upon factors like the individuals and their interests and calculations, or is it factors like norms, culture, or belief systems of the community that are the relevant explanatory variables? Moreover, where do policy networks fit into this model? At this stage, there should not be any doubts about the relevance of considering relational aspects when conducting policy research (see section 3.2). The stance taken in this thesis is that policy making should be understood within an institutional framework, where the term *institution* refers to the informal and formal rules structuring individual actions. The networks are the appropriate analytical unit for the study of policy making and the outcome of such processes. The reasons for taking this position are discussed in the following sections.

The under-socialized³ view, prevailing in neo-classical economics, corresponds to an extreme version of methodological individualism reducing all social phenomena to explanations of rational actions on the individual level. This view was presented, and dismissed, in a previous section stating that policy making is more than individuals positioned in a structural vacuum. The opposite position is taken by the cultural explanations and the wide range of structural theories—many of them positioned within the social constructivist framework⁴. The constructivists depart from the

³ The terms *over-* and *under-socialized* have been adopted from Granovetter (1985, 1992).

⁴ However, the great variety of frameworks should be emphasized, and some writers have even questioned the idea of talking about one constructivist approach (Smith 1999)⁴.

rational choice proponents by ascribing structural variables (i.e., social institutions such as ideas, norms, and rules confining the interactions') high importance. Institutions "control human conduct by setting up predefined patterns of conduct, which channel it in one direction as against the many other directions that would theoretically be possible" (Berger and Luckmann 1967, 55). In its more extreme versions, representing the over-socialized view, research is entirely focused on the structural level, explaining social behavior according to existing cultural norms and beliefs. Strictly interpreted, this approach considers the behavior of individuals to be deterministic, given by the social context into which individuals are situated (Granovetter 1992).

Bogason (2000) argued that a standpoint considering the two approaches as incompatible and excluding is rather unfruitful. Excluding the actors on a micro-level or neglecting the importance of norms on a higher macro-level is regarded as counterproductive. The importance already attached to the relational aspects of policy making makes the use of a strictly individual perspective, in which the actors are perceived as utility-maximizing individuals isolated from their social context, fruitless. At the same time, it has been emphasized that individuals, in their bounded rationality, must be the building blocks of policy networks since only individuals are capable to act. It cannot be the one or the other, but both.

3.3.1 Ideas of New Institutionalism

A combination of individual and structural variables (incorporating a wide range of understanding of the latter) is also the common denominator of theories within the new institutionalism framework that has gained immense attention in social science research and related disciplines (Brorström and Siverbo 2002; Koelbe 1995; Nee and Ingram 2001; Peters 1999). "By now it is clear that the institutional revolution is as important as the behavioral revolution was in the 1950s and 1960s" (Blom-Hansen 1997, 669). Although some neglected institutional theory does provide a useful theoretical foundation for the policy network approach, this standpoint has been theoretically stressed and empirically demonstrated (Blom-Hansen 1997; Heikkila and Isett 2004; Mizuchi 1994; O'Toole 2000; Provan, Isett, and Milward 2004). The proposition of this thesis is that ideas regarding institutions and the processes in

which these emerge provide a useful foundation for the policy network approach. An institution is a structural feature of social life. An institution “transcends individuals to involve groups of individuals in some sort of patterned interactions that are predictable, based upon specified relationships among the actors” (Peters 1999, 18). In the terminology of North (1997; 1990), they are “the rules of the game” or, as formulated by Ostrom (2005, 3), institutions can be broadly understood as “prescriptions that humans use to organize all forms of repetitive and structured interactions.”

Despite immense variety, the theories constituting the framework converge in the comprehension of institutions as the result of purposive action. Further, they all treat the notion of structure as important, affecting human activities, but diverge regarding the level of importance they ascribe them. They agree on the fact that institutions matter (i.e., affect political action and performance), yet depart regarding their nature and the degree of constraints these put on human agency and individual autonomy (Peters 1999). Depending upon perspective adopted, it is either common norms or routines, historical patterns or rules that constrain individual action. For example, while the mainstream version of rational choice institutionalism⁵ perceives institutions as rules, an exogenous variable merely constraining the incentives and choices of fairly autonomous individuals, normative institutionalism⁶ focuses on the norms and values constantly framing and being reframed by the appropriateness of a situation to which the actors have to adapt.

In this thesis, the line of rational choice institutionalism associated with the Institutional Analysis Development (IAD) framework developed by Ostrom and colleagues is used as a frame of reference (Imperial 1999; Ostrom 2005; Ostrom, Gardner, and Walker 1994; Tang 1991). The underlying proposition of the IAD framework is that different outcomes can be explained by the way different

⁵ “Institutions are rules, enforcement characteristics of rules, and norms of behaviour that structure repeated human action. Hence, they limit and define the choice set of neo-classical theory” (North 1997, 87).

⁶ “Political institutions are collections of interrelated rules and routines that define appropriate actions in terms of relations between roles and situations” (March and Olsen 1989, 160).

institutional arrangements have evolved to solve a given policy problem⁷. Without presenting the framework any further, similar assumptions are used as a point of departure in this work. Many of the characteristics that Peters (1999) ascribe the institutional school within the rational choice paradigm are not as prominent in Ostrom's writings. Preferences are not considered merely as exogenous, predetermined variables; on the contrary, they are shaped within the institutional setting—for example, as a result of learning. Norms of reciprocity, trust, and cooperation might or might not rise due to the characteristics of the interactions (Ostrom 2005). Institutional change is perceived as a continuous process in which elements of learning are prominent. However, in accordance with other rational choice theories, the concept of rules is imperative. Rules are thought of as “the set of instructions for creating an action situation in a particular environment” (Ostrom, 2005, 17). The rules are “rules-in-use,” to be separated from “rules-in-form,” and need not be written or formal, but are self-crafted and a result of a problem-solving process (Ostrom 2005). This is also how the term *institution* is understood in this thesis, and the term *institutionalization* is used to describe the process in which these emerge. This can be compared to the discussion about the nature of policy and policy-making processes in the introductory chapters. Thus, policy making is about finding institutional arrangements for common problem solving. One way of doing this is networking.

3.3.2 Processes of Institutionalization

All institutional theories link the macro constraints of the institution on a structural level (in this thesis defined as “rules-in-use”) with the micro-behavior of the individual. Granovetter (1985; 1992) has convincingly conceptualized this process in his argument about embeddedness. As individuals are perceived as embedded in webs of interactions, the main argument is that social action can best be understood in relational terms. The logic of embeddedness acknowledges both agency and structure

⁷ At the center of the IAD framework is the “action arena,” composed of the “actors’ situation,” which refers to the social realities or circumstances that affect the individuals and participating “actors” as well as their preferences, resources, and other individual characteristics. The action arena is affected by external factors, like the attributes of the biophysical world, the attributes of the community, and the rules in use.

(and its reciprocal relationship)⁸ and is quite compatible with the institutional approach adopted earlier. However, the main contribution of Granovetter is the highlighting of the ongoing web of interactions—the networks—in the study of these institutionalization processes. As such, the discussion about the relational aspects of policy making (see section 3.2) and the notion of institutions and institutionalization (see sections 3.3 and 3.3.1) are linked together.

The powerful argument so clearly articulated by Granovetter is that, although both sides (the under- and over-socialized views) are opposites, they converge because of their “conception of action as uninfluenced by peoples’ existing social relations” (Granovetter 1992, 6). The rational man is atomized due to the lack of a social context, the social man because of the total irrelevance ascribed to the continuing social relationships. This ignorance of the ongoing web of interactions restricts the possible explanations that could be deduced.

The argument of embeddedness has a clear institutional stand, comparable to rational choice institutionalism⁹, suggesting an analytical frame that combines elements of methodological individualism (assuming the bounded rationality of self-interested actors) with an institutional approach and acknowledging that all actions are socially situated.

Linked to the discussion about methodological individualism, one could say that this position is represented in a weaker version, where explanations can be looked for at both the micro- and macro-level¹⁰ (Udehn 2002, 502). Hay (1995) also stresses the importance of applying a relational approach to the dilemma, stipulating that “one person’s agency is another person’s structure” and that “a social or political structure

⁸ This reciprocity is perhaps most associated with Giddens’ (1984) *duality of structure* emphasizing the reciprocal relationship between the two variables.

⁹ However, Granovetter (1985) writes that his conception of embeddedness does not share the functionalistic element present within rational choice institutionalism.

¹⁰ The notion of methodological individualism can be discussed on various levels: ontological, epistemological, or methodological. Here, the concept is treated as an analytical tool, not as an idea of the absolute order of universe. This view can be compared to Rothstein’s (2003) “instrumental-empiricist” epistemology.

only exists by virtue of the constraints on, or opportunities for, agency that it effects” (189-191). Accordingly, applying a network approach is viable for understanding the institutions of political life, including their rise, existence, and change.

Evidently, policy networks and institutions are closely interrelated concepts. Policy networks are often perceived as institutions (see, for example, Bogason 2000). However, one characteristic of institutions—namely, their durability (Brorström and Silverbo 2001, 28), in regulating repetitive behavior—makes the term *institution*, when referring to policy networks, somewhat fragile. It is not clear when a policy network should be understood as an institution, structuring individual action, and when it should be considered merely as aggregations of individuals interacting. Other researchers (see, for example, Parker 2007) have raised this highly relevant issue, questioning the difference between networks and governance (policy) networks. Evidently, no easy way exists to make this separation as no clear dichotomy exists. Essentially, the distinction must be made based upon an interpretation regarding the structural effects that the institutions within a policy network in question put on the individual behavior. Considering this ambiguity, policy networks are perceived as “organized entities that reflect specific types of institutional arrangements” (Carlsson 2000, 58). One can assume that the actors within a policy network represent different institutional arrangements, depending upon the context they represent; at the same time, as they start to interact with one another, common institutionalization processes start within the policy network, establishing the rules of the game. In this thesis, policy networks are regarded as organized entities reflecting institutional arrangements and with the potential capacity to form institutions that structure the behavior of the participating individuals. Within these networks, institutional norms and rules are shaped along the working process through the bargaining interactions of the participating individuals and affected by the specific action situation. The strengths of the institutional characteristics might vary (acknowledging the ambiguity of regarding networks as institutions), and both the strengths, as well as their substance, will have an effect on collective action and problem solving.

Thus, the ability to craft rules and the content of the rules are thought to be dependent upon the network interactions. Many different views exist regarding what elements

characterize good institutional conditions; many of them refer to a general idea of the establishment of a collective good. “A good institution is one which is capable of making rules that constrain individual maximization when maximization is collective destructive” (Peters 1999, 68). Rothstein (2003), while claiming that effective institutions are those that reduce transaction costs¹¹ of collaboration, poses the same kind of argument. According to this view, effective institutions are those that make possible the cooperation between people who have a common interest of cooperative action but hold opposite interests. Thus, within these networks is a correspondence between the individual and collective rationality. Policy networks are important since their characteristics are assumed to affect the ability to overcome these difficulties, craft rules, and build effective institutions. This notion is what justifies the importance of treating networks seriously.

The argument of embeddedness explicitly points toward the need to study networks of interactions in order to understand processes of institutionalization. This idea is attractive because of its intuitive simplicity and because it offers a solution to the problem of explaining both the creation and change of social institutions—issues that have been somewhat troublesome to the paradigm of new institutionalism. The frame of reference adopted in this thesis might be illustrated by Figure 3.1 below, adopted from Marsh and Smith (2000), which explicitly reveals how networks are related to the various structural aspects, individual agency, and outcome. Together with the theoretical discussion about human agency, institutional constraints, and institutional outcomes, this figure summarizes the discussion about the explanatory value of policy networks held so far.

The relation between policy networks and their performance is complex. The figure implies a *dialectical* relationship between network and agency, between network and structural context, and network and outcome. “A dialectical relationship is an interactive relationship between two variables in which each affects the other in a

¹¹ These costs are “the costs of measuring the valuable attributes of what is being exchanged and the costs of protecting rights and policing and enforcing agreements” (North 1990, 27).

continuing iterative process” (Marsh and Smith 2000, 5). Evidently, policy networks are the result of ever-ongoing processes (Evans 2001).

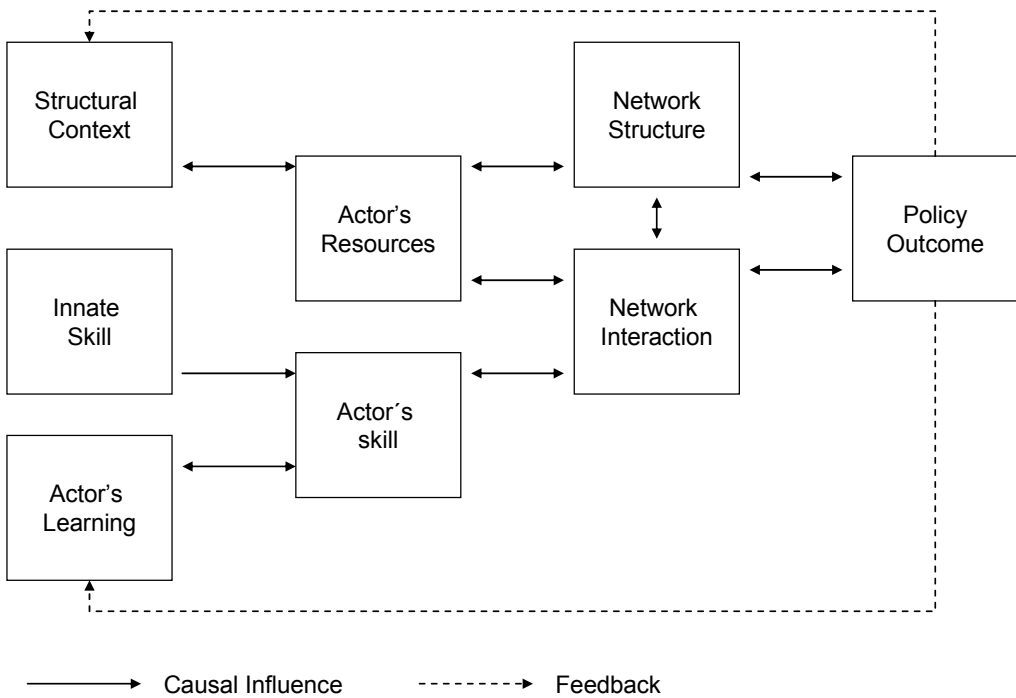


Figure 3.1 How Policy Networks Relate to Policy Outcome (Marsh and Smith 2000, 10)

To conclude, in order to achieve collective action, networks have to be formed. Actors, driven by different purposes, come together in bargaining relationships, based on exchanges of various kinds of resources, to form policy networks. Derived from institutional theory and the argument of embeddedness, it is assumed that these repeated interactions are affected by, and also form, institutions that generate rules, norms, and values constraining the interactions. The processes of institutionalization that occur affect the individuals within these structures and vice versa. In reality, the multilevel world of policy making is a known fact (Ostrom 2005), not explicitly visible in the model. Institutions are formed and are forming action at different levels of organization.

3.3.3 Network Structure as Explanations

Figure 3.1 encompasses a large amount of variables. In order to perform empirical analysis, it is necessary to concentrate on one or a few “boxes” and on some of the relationships. The assignment taken on in this thesis is to explore the relation between the two boxes “network structure” (i.e., the pattern of interactions) and “policy outcome,” or network performance. This does not imply that the other variables or relationships are irrelevant; for example, Emirbayer and Goodwin (1994, 1415) have criticized some of the work done on network analysis for neglecting “all varieties of culturalism, essentialism, and methodological individualism.” The chosen line of action is a matter of analytical demarcation and can be advocated based on the proposed impact of network structures, as reflections of the bargaining interactions, characterizing the policy processes. Thus, it is the relation between network structure and performance that is important in this thesis.

Proponents of SNA state that information about network structure elucidates the underlying features and qualities of the more stable interactions. Thus, network structure also reflects patterns of influence and power. “The general hypothesis is that the proximity of two actors in social networks is associated with the occurrence of interpersonal influence between the actors” (Marsden and Friedkin 1993, 127). “The structure of relations among actors and the location of individual actors in the network have important behavioral, perceptual, and attitudinal consequences both for the individual units and for the system as a whole” (Knoke 1990, 9). The network structure of a policy network imposes both constraints and opportunities for individual action. The pattern of the relations either enhances or restricts collective action and the process of resource allocation. Consequently, the success of a policy program does not only depend on its content and the characteristics of the actors involved, but also on the network as a whole. Some networks might be assumed to be more effective than others in achieving collective action and crafting effective institutions. “Using a network perspective not only highlights the characteristics of the decision situation in which actors perform but also makes the blockage and problems of joint action visible for them” (van Bueren, Klijn, and Koppenjan 2003, 211). As such, the “good” network structure promoting the effectiveness of collective action and resource mobilization can also be detected using this approach.

This chapter has suggested that policy networks (more specifically, their network structure) presumably affect policy making and performance. The next question is in what specific ways does the network structure of policy networks matter? What kinds of network qualities can be assumed to impact performance? In other words, what theoretical propositions could be made regarding the network structure of effective policy networks? These issues will be dealt with in the next chapter, applying the notion of social capital.

CHAPTER FOUR

Network Structure, Social Capital and Performance

The main insight generated from Chapter 3 focused on the idea that the network structure of policy networks is likely to possess explanatory power. In this chapter, the importance ascribed to the network structure will be further discussed and the assumed relation more refined. The central question concerns in what way certain network qualities might affect the policy-making process. What kind of network structures facilitates collective action and successful outcomes? Thus, the aim of this chapter is to outline what high performing policy networks presumably ought to look like in network terms.

4.1 The Many Faces of Social Capital

Although the concept of social capital was not explicitly discussed in the preceding chapter, its fundamental ideas have been all pervading throughout the reasoning and, clearly, in the conclusions drawn. Actually, the perception of policy networks as structures of purposive action, reflecting processes of resource mobilization and collective action touches upon the very essence of social capital theory. Furthermore, the argument about embeddedness attributes the significant influence of the “web of relations” on these processes. These ideas have also been widely applied in social network research, often in association with the notion of social capital (see, for example, Borgatti 1998; Borgatti, Jones, and Everett 1998; Burt 2000).

The argument that networks affect the process of resource allocation is a basic implication of social capital theory. Social capital suggests that “how, or the way, individuals relate to one another affects their own and others’ long-term benefits (both positively and negatively)” (Ostrom and Ahn 2003, xiii). The concept has been

given a variety of different meanings and been applied to a wide range of social phenomena at the individual, group, and community level (Borgatti and Foster 2003; Kadushin 2004). Despite this, there are basically two elements that unite them all. First, social capital is “a metaphor about advantage” (Burt 2000, 346-347). Second, this advantage is assumed to spring out of the social structure. “The social capital metaphor is that people who do better are somehow better connected” (Burt 2000, 347). This stance can also be deduced from the term itself since the central connotation of capital designates some kind of return for the investor. “Social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence” (Coleman 1990, 302). Social capital deviates from physical and human capital as it is embedded in and thereby an asset of the relations themselves (Coleman 1990, 302)¹². A large and diverse set of scientific work falls under this metaphorical perception of social capital. Thus, divergent viewpoints become apparent as the concept is more refined and empirically applied

Within the branch of political science, social capital is foremost associated with Putnam’s work. Thanks to his studies, *Making democracy work* (1992) and *Bowling alone: The collapse and revival of American community* (2000), social capital theory reached a wider audience, both within and outside the scientific community. According to Putnam (1995, 2), “social capital refers to features of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit.” In spite of, or perhaps due to, the immense attention received, the work has been subject for substantial critique both concerning empirical design and its theoretical underpinnings (see, for example, Kwon 2004; Portes 1998; Portes and Landolt 2000; Rothstein 2003). The critique concerns the very definition of social capital, pointing out that it holds some serious limitations when it comes to theory building and empirical testing. Critics claim it is too wide as the elements incorporated within the definition can be internally correlated, causing a circular analysis, as the very definition of the concept becomes inseparable from the assumed effect. Consequently, the explanation becomes a part of the thing to be explained, and social capital is perceived as both the cause and its effect.

¹² For a comprehensive discussion of different aspects of capital, see Chapter 1 in Lin (2001a) or Chapter 12 in Coleman (1990).

Social capital as a structure of advantage is an effective working idea; however, for the sake of generating propositions for empirical use, a higher degree of operationalization than what Putnam's own definition offers is essential (Portes 1998; Portes and Landolt 2000). Interpretations of social capital that hold more than one element must be analytically separated and given independent empirical measures¹³. In this thesis, social capital is thought of as "resources embedded in a social structure which are accessed and/or mobilized in purposive actions" (Lin 2001b, 12). The definition does not in itself identify the resource or the beneficiaries. In taking this stance, the debate regarding the intrinsically good of social capital is completely irrelevant. The concept refers to resources embedded in networks and should not, by definition, be perceived as a promoter for the goodness of society.¹⁴

Social capital consists of two main ingredients—embedded resources and network relations—that ought to be analytically separated. Scholars have handled this matter differently. Ostrom and Ahn (2003) distinguish between a minimalist and an expansionist branch of social capital research. While the former addresses the network structure of relations, the latter is more concerned with the broader factors enhancing collective action. Some researchers have focused their attention on the amount or quality of the embedded resources, while others have studied the properties of the network relations. To exemplify, Lin, Fu, and Hsung (2001) consider the embedded resources as the very basic element of social capital and networks as mere facilitators. Others, for example Burt (2001; 2000; 1997), concentrate on the networking aspect, treating the network structure as the key element identifying the existence of social capital. The search for network configurations that promote the rise and growth of social capital is the main

¹³ Portes (1998) also commented on the importance of controlling the directions of cause and effect and checking for the existence of hidden variables. Although important, this recommendation is difficult to consider. Most researchers within social sciences work with correlations, not causations, as relationships are often dialectical (see, for example, Figure 3.1 in this thesis).

¹⁴ Rothstein (2003) discusses the "dark side" of social capital in connection with the existence of organizations such as Hells Angels, which might not be considered as contributing to the rise and growth of social capital in the meaning of trust in society in general. The position taken here is that social capital should not, by definition, be considered good for society in general. Thus, when using the term, it is vitally important to express who is supposed to enjoy the advantage of being "better connected."

assignment, trying to identify network qualities that could explain why certain individuals or groups perform better than others. This latter line of research, focusing on the relational aspects of social capital, is compatible with the ambition of this thesis, which is why the notion of social capital is incorporated into the theoretical framework of this thesis.

The great diversity of social capital research concerning the elements being accentuated and the empirical measurements used does not necessarily weaken the concept, a worry sometimes expressed in the literature. Portes (1998) claims that the wide range of applications and conceptual stretch might drain the concept of meaning. Seen from a different angle, the variety might in fact initiate new lines of thinking and, perhaps, make fruitful inter-disciplinary learning possible. In this thesis, the literature on social capital contributes to the broad theoretical context, most importantly extracting hypotheses regarding how different network configurations might affect the organizing process described in Chapter 3 within policy networks.

In Chapter 3, the explanatory power of policy networks was discussed with reference to their institutional capacities, forming rules that structure the bargaining interactions and affect the outcome and performance of the policy process. It was also assumed that certain types of networks are better equipped than others in network terms and, thereby, also enjoy higher returns. This perspective converges with the general notion of social capital. Social capital “is a core theoretical concept that helps to synthesize how cultural, social, and institutional aspects of communities jointly affect their capacity to deal with collective action problem (Ostrom and Ahn 2003, xvi). With the point of departure in the branch of social capital research engaged with its relational aspects, hypotheses concerning the qualities of higher performing networks can be generated, bringing the question of how network structure affects policy networks one step further and closer to an answer.

4.2 Social Capital and Network Structure

What kinds of network enhance the rise of collective action and the establishment of high performing and effective institutional arrangements? The literature outlines primarily two divergent ideas on the network structure of social capital: *network*

closure and *structural holes*. Both qualities treat the flow of information, within and outside the network, as the central issue. In this section, these conceptual ideas are presented and an attempt (by Burt 2000) to unite the two, seemingly incompatible, perspectives is suggested, generating hypotheses regarding the qualities of effective policy networks.

4.2.1 Social Capital as Network Closure

Social capital as network closure refers to Coleman's (1990) assumption about the advantage of closure within social structures¹⁵. A network characterized by closure has a high level of interconnectedness. The actors are linked directly by many and strong relations or indirectly through a single contact (Burt 2000). The basic proposition is that closure facilitates the interactions because of an enhanced communication among the participators. Given the many information channels, rich and accurate information is available throughout the network. Within a well-connected network, information flows freely, promoting the creation of common norms and common values, so vital for a culture of joint action to evolve (Coleman 1987). Trust and reciprocity are keywords, and collaboration is further facilitated since the connectedness allows for the use of sanctions to prevent and restrain opportunistic behavior (Burt 2000; Coleman 1990; Lin 2001). An individual embedded in this type of structure is regarded as rich in social capital. Networks with high levels of network closure have more social capital and are, accordingly, more successful in achieving collective action than others. This is how performance relates to social networks according to this first conceptual idea. Accordingly, the process of institutionalization (see sections 3.3.2 and 3.3.3) is enhanced within these networks, affecting the problem-solving capacities.

4.2.2 Social Capital as Structural Holes

While the idea of network closure points toward the significance of accurate information channels within a group of actors, the notion of social capital as structural holes underlines the importance of information diffusion between actors or between different sets of actors. The ideas can be ascribed to Burt (2000), but draw

¹⁵ Bourdieu (1986) also regarded social capital as an investment, pointing to the importance of "closed networks" as a way for the dominant group to maintain its advantage in society (Lin 2001).

on previous work, such as Granovetter's (1973) often-quoted article "The Strengths of Weak Ties"¹⁶. The core of this conceptual reasoning contrasts the notion of social capital as a function of network closure.

Structural holes are defined as the absence of connections or as the presence of weaker connections within networks. Metaphorically, they are holes in the social net. "Holes are buffers, like an insulator in an electric circuit. People on either side of a structural hole circulate in different flows of information" (Burt 2000, 353). The actors in position to bridge these holes have a strategic advantage as structural holes offer "an opportunity to broker the flow of information between people, and control the projects that bring together people from opposite sides of the hole" (Burt 2000, 353). Thus, the very existence of holes provides certain opportunities; actors who are successful in taking advantage of these enjoy the benefit of brokering information among actors on each side of them. Contrary to the information available within closed networks, this information is non-redundant. In other words, it represents new, additional resources available in the bargaining activities. Burt's comprehension emphasized the exchange of information; still, also other resources might be objective for exchange (see section 3.1). Thus, the structural hole argument is applicable on other types of resources in addition to information.

The fundamental idea of structural hole theory is that people who constitute bridges between structural holes are rich in social capital because they have access to new and more diversified sets of resources. Accordingly, networks comprised of such individuals are considered rich in social capital, rich in opportunities, and, therefore, better performing. Burt (2000, 355) uses the term *entrepreneur* to describe the interpersonal bridges and the term *entrepreneurial networks* to refer to the networks. Accordingly, these kinds of networks presumably promote the existence of relevant resources in the institutional processes of problem solving going on within these policy networks (see sections 3.3.2 and 3.3.3).

¹⁶ Granovetter's (1973) article "The Strength of Weak Ties" turned the attention to the importance of weak ties as bridges between separate groups. Weak ties are assumed to give advantages in many respects, such as by providing job opportunities.

Evidently, the two perspectives, regarding social capital as either network closure or as structural holes, are seemingly contradictory. Burt (2000) supplements the theoretical debate introduced above with an extensive compilation of empirical research conducted on the possible relationship between network structure and social capital¹⁷. The findings generated by this overview indicate that, although the proposition regarding structural holes is verified, the perception of social capital as a function of closure could be questioned. However, the strengths yet associated with the closure argument initiated an attempt to integrate the two propositions into a comprehensive understanding of the network structure of social capital on a network level—a perspective relevant to the aim of this thesis.

4.2.3 The Network Structure of High Performing Networks

The combined approach acknowledges the ideas of both network closure and structural holes as important qualities for performance, although by fulfilling different functions in the process of network collaboration. For the sake of enhancing analytical clarity, the *local* and *global* structures of policy networks are considered separately. The local structure refers to the in-group activities of the network, whereas the global structure refers to how the network is connected to other network constellations.

Structural holes within the local network structure significantly complicate the process of collective action because of the poor communication they cause. The low level of interaction among the involved does not encourage the rise and establishment of common norms and rules (i.e., the institutionalization process) necessary for the process to run effectively (Burt 2001, 49). Consequently, the prospects of collective action are considerably lower within networks characterized by many *local structural holes*. On the contrary, the function of collective action is more effectively promoted by a structure with a high degree of network closure.

However, when the global network structure is taken into account, the amount of structural holes might be positively associated with network performance. The

¹⁷ It should be noticed that a large variety of outcomes concerning the indications of successful performance exists among the studies included in Burt's compilation.

constellations whose actors span many *global structural holes* reaching out to other network clusters enjoy an advantage because of the access to divergent information and to a diversity of resources, enhancing the process of resource mobilization. The underlying logic is that “while brokerage across structural holes seems to be the source of added value, closure can be critical to realizing the value buried in the structural hole” (Burt 2000, 398). Thus, the two qualities enforce one another in the process of resource allocation and policy making described in Chapter 3.

This understanding is further supported by other studies, which sometimes use different terms. For example, Reagans and Zuckerman (2001) found that networks (in this case, R&D teams) that are characterized by in-group closure and simultaneously contain members spanning many global structural holes are more successful than others. In a study of knowledge transfer, Reagans and McEvily (2003) found that both cohesion and range (ties that cross institutional boundaries) affect the processes positively. Similar results are brought forward by Oh, Chung, and Labianca (2004), who tested the hypothesis that both group closure and cross-boundary ties are important for effectiveness. The higher returns following interactions between actors controlling divergent resources have also been theoretically conceptualized by Lin (2001a), who states that the so-called heterophilous interactions—exchanges among actors with dissimilar resources—require a bigger effort, but also pay higher returns for the investors. The implications of the network structure on performance are illustrated in Figure 4.1.

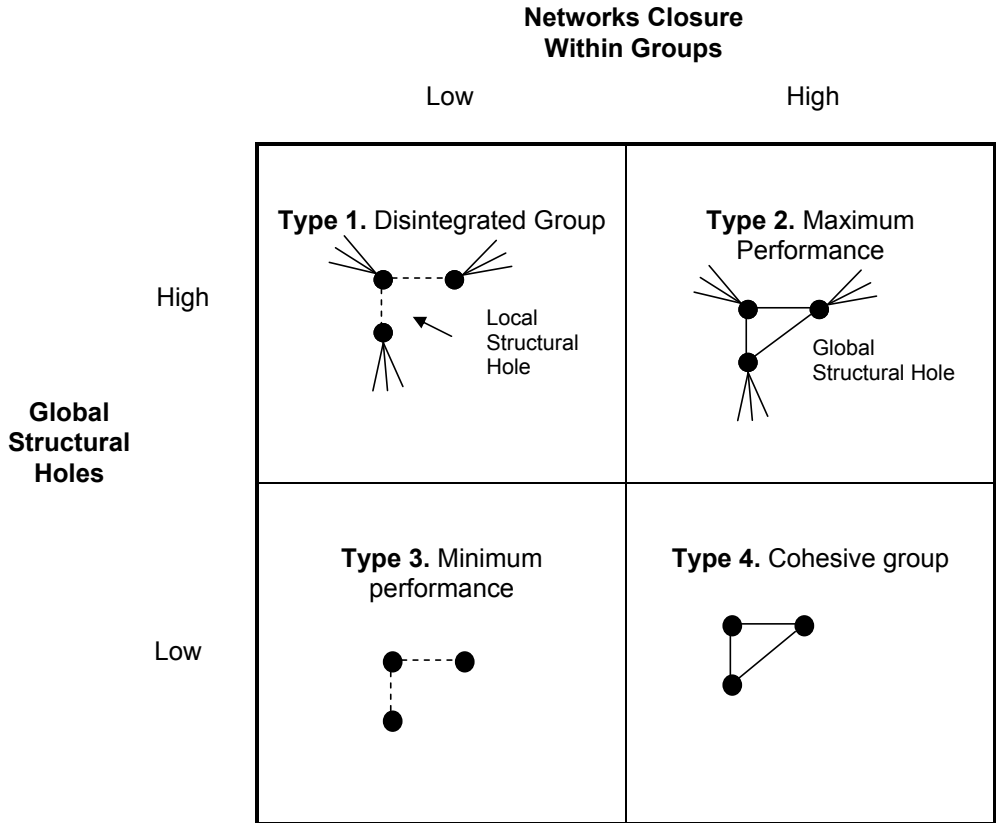


Figure 4.1. The Connection between Network Structure and Network Performance (based on Burt 2001, 48)

In Figure 4.1, the two network qualities are combined, resulting in the construction of four different ideal types. The network of Type 2, in the top right, represents the image of a high performing network. The advantage provided by many global structural holes and bridges across them, promoting the process of resource mobilization, is combined with the positive consequences of an internal network structure characterized by a tightly connected group of actors. No local structural holes obstructing the internal processes of cooperation exist within this network.

The network of Type 4 represents a well-connected network with numerous in-group interactions, fostering internal collaboration. However, this network might suffer

from an insufficient process of resource mobilization, given the nonexistent connections reaching out to other groups of actors.

Type 1's network contains actors in possession of dissimilar resources, spanning many global structural holes. However, structural holes simultaneously exist within the network, making the process of collective action problematic. The same is true for Type 3, which reflects a structure that is weakly connected internally while lacking the necessary connections to other network constellations. Considering the low level of interconnectedness within both these networks, it might even be questioned whether they really should be perceived as networks. However, being only schematically described, these images are analytically used to represent sparsely connected networks.

Based on the implications summarized in Figure 4.1 and the discussion in Chapter 3, hypotheses regarding the relation between network structure and network performance will be formulated.

4.2.4 Summary and General Hypotheses

In this thesis, the explanatory power of policy networks is addressed. The main question framed in Chapter 1 concerned the possible relation between the network structure and the organizing capacities and performance of policy networks.

According to the theoretical framework presented in the current and previous chapters, policy networks are perceived as organizing structures for problem solving in which actors, driven by different purposes, exchange various kinds of resources in bargaining games. These bargaining interactions of resource allocation affect the organizing capacities of the networks; deduced from the argument of embeddedness and institutional theory. Policy networks are perceived as organized entities, reflecting institutional arrangements and processes of institutionalization struggling with joint problem solving. The network structure elucidates the web of ongoing bargaining interactions within these networks; it has been proposed that this variable does matter for the process of policy making or performance.

The question regarding in what ways network structure affects performance has been further conceptualized in this chapter, in which the notion of social capital framed the discussion. With the point of departure in a comprehensive theory proposed by Burt, drawing upon scholars like Coleman and Granovetter, two network qualities—network closure and structural holes—were suggested as significant properties affecting performance. With reference to this, the following interrelated hypotheses, regarding the relationship among network structure, organizing, and performance, are formulated.

H1. The network structure matters for policy making within policy networks and affects performance.

More specifically,

H2. Two central network qualities—namely, network closure and the existence of global structural holes—have an effect on performance. Although structural holes are potential sources of resources, network closure is critical for the use of the resources obtained.

Consequently,

H3. A high performing network is a network with a local structure, characterized by a high level of closure, that spans structural holes in the global structure.

The relevance of these theoretical ideas will be tested in the empirical part of this thesis. Although these hypotheses are generally formulated, they are firmly anchored in previous network research and fulfill the purpose of identifying which aspects of network structure are likely to affect policy making. The next step is to refine the propositions; thus, in addition to testing the relevance of these broad assumptions, the ambition is also of a more exploratory kind—namely, to further specify their potential in explaining organizing and performance.

Before moving on to the empirical part of the thesis, the central theoretical concepts applied to capture both the independent (network structure) and dependent (performance) variables of the research design must be further refined in order to make them empirically applicable. As will be noted, the hypotheses formulated thus

far also have to be modified to fit the conditions and consequences of the adopted methodological approach. This will be the topic of the next chapter.

CHAPTER FIVE

Network Structure and Network Performance: Making the variables measurable

This chapter constitutes a bridge between the theoretical and empirical aspects of this thesis. In previous chapters, the theoretical arguments for treating networks seriously and the reasons for ascribing them explanatory power in analysis of policy making were presented. In Chapter 3, ideas about purposive action, bargaining, institutions, and institutionalization formed the foundation to why network structure could be treated as an independent variable. In Chapter 4, by reviewing previous social network research, a set of general hypotheses relating network structure to network performance was presented. Thus, with the broad theoretical framework based on incorporating concepts and ideas concerning these policy networks, the empirical investigation will be focused on testing the relevance of the hypotheses. The logic for this is explicated in Figure 5.1.

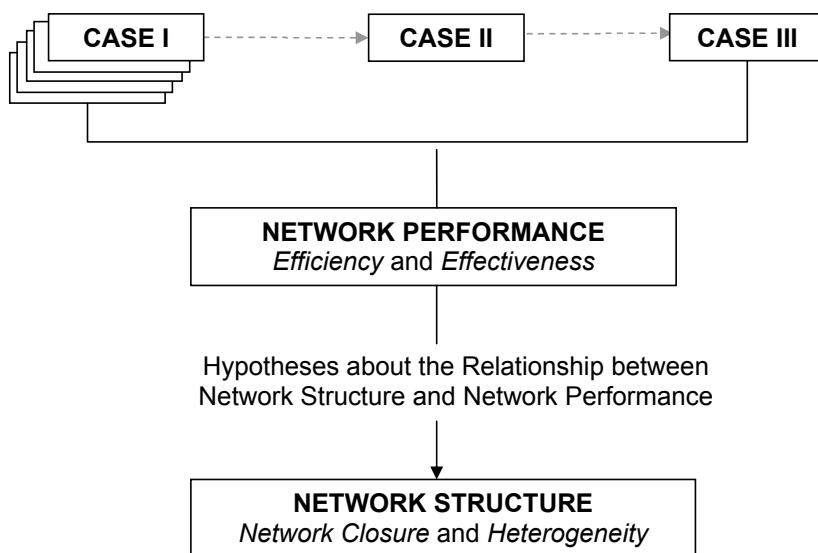


Figure 5.1. Connecting Theory to the Research Design

In order to proceed, the central theoretical concepts must be further specified, making them empirically measurable. Network performance will be determined by applying the terms *effectiveness* and *efficiency*. Based on previous social network research, *network closure* and *global structural holes* (termed *Heterogeneity* in Figure 5.1, which will be explained in this chapter) will be translated into a set of network measures, indicating their presence or absence within the policy networks of the case studies.

5.1 Network Performance

Network performance, which refers to the outcome of the networking activities, considers both the intended and unintended results of the process¹⁸. With reference to our understanding of policy networks as problem-solving entities, performance will be evaluated due to organizing capacities and ability to deal with these problems.

¹⁸ The outcomes of the processes are addressed, not the output or the outgoing effect of any given action or program.

Effectiveness connotes many meanings (see, for example, Abrahamsson 1993; Vedung 1997). Although somewhat difficult to separate either theoretically or empirically, a distinction between the *external* and *internal* effectiveness of the policy networks is made here, capturing different qualities of the problem-solving capacities. In this thesis, *effectiveness* (external effectiveness) will be recognized as the ability to produce the desired result or as the ability to reach the organizational objectives around which the networks have been formed. This quality is distinguished from the term *efficiency* (internal effectiveness), which is more concerned with the internal organizing process and the relation between performance and the costs for performing, pointing to the effort and resources required to produce the desired results¹⁹ (Abrahamsson 1993). As emphasized earlier, while external effectiveness is about doing the right thing, efficiency is about doing things right (Figure 5.1). This understanding has been previously related to different network structures (Ylinenpää 2007). Both angles of effectiveness will be analyzed in relation to the policy networks dealt with in the forthcoming chapters.

5.1.1 Effectiveness

The effectiveness of the policy processes is examined by asking questions about the level of goal attainment. When applying a top-down perspective in evaluations, program goals formulated by authoritative centers are used as a frame of reference (Sabatier 1986). Success and failure are judged according to the fulfillment of these centrally sanctioned goals. The bottom-up approach to evaluation is more complex, acknowledging the variety of both actors and goals present in policy making. Some of the difficulties related to the bottom-up approach and particularly associated with the evaluation of networking are discussed by Kickert et al. (1997). For example, issues concerning whose goals to evaluate, how to weigh the importance of different goals, and how to aggregate different viewpoints might become extremely problematic concerns for bottom-up research designs. However, evaluations from the bottom up do not necessarily imply goal-free evaluations. As discussed in Chapter 2, a bottom-up focus on the networks' problem-solving capacities and the 'problem' guiding the research are ultimately set by the researcher, disregarding the existence of certain program goals.

¹⁹ In Swedish, this feature is often called productivity.

In Chapter 2, when discussing how the analytical units have been defined and delineated in each case study, it was suggested that the approach of this thesis essentially draws on a bottom-up methodology; however, at the same time it might be comprehended as including elements from a top-down approach. The reason for adopting such a position was that the formulation of the analytical research problem, defining the analytical units, in some cases (Cases I and Case II) concerns the realization of formal policy programs. This is also the case when it comes to the comprehension of effectiveness, which is evaluated according to the extent to which these problems are solved and the goals achieved.

In this thesis, the effectiveness of the policy networks is evaluated with reference to their problem-solving capacities by addressing the overall goal fulfillment. In Case I, the ability to establish new and innovative knowledge areas, or arenas, for research and education will be considered as an indicator of this quality. In Case II, effectiveness is indicated by whether a research school, enabling regionally based knowledge production and fulfilling the goals of the involved key sectors, realizes its goals or not. In Case III, involving a network for natural resource management, the issue of effectiveness will be related to the adaptiveness (i.e., to what extent policy making responds to the status of the ecosystem and changes within). More specific questions, asked in each case to connect the empirical material to the idea of effectiveness, will be further defined in each empirical chapter.

5.1.2 Efficiency

The complexity of actors, interests, and goals present in policy settings is a recurrent theme of this thesis. The bargaining character of the processes implies that goals are not easily set; indeed, they are constantly being negotiated. As a matter of fact, the actors' ability to modify their own goals and weigh their own purposes against others is an important feature of a well-functioning policy process (see section 3.2). The ability to reach consensus, such as what line of action to take and how, among the involved is sometimes called the "covenanting capacity" of networks. In this thesis, this capacity is captured by the term efficiency, referring to the internal processes, which is elucidated by asking the respondents about the work, time, and resources

needed to reach their ambitions. In other words, efficiency is believed to capture the capacity for collective action.

In Case I, efficiency is empirically indicated by whether the processes result in new arenas or not, and by considering the amount of resources, in terms of time, it takes to get to this point. This measure is thought to reflect the networks' capacities for collective action. In Case II, the achievement of joint action is evaluated by studying the occurrence of mutual adjustments, if and how compromises have been made, and if the actors have adjusted their goals and expectations in relation to one another. Finally, in Case III, efficiency is measured by the rule-forming capacities of the management system, examining whether the actors have come to terms to set common rules to regulate the appropriation of the resource. A more specific explanation for how the empirical material is related to the notion of efficiency will come in the empirical chapters.

Undoubtedly, the notions of effectiveness and efficiency are closely intertwined. Still, while the former assigns the qualitative aspects of collective action, the latter is about its very existence. In regards to the top-down/bottom-up discussion, one could perhaps propose that the understanding of efficiency that is applied in this thesis is more related to the bottom-up methodology while the notion of effectiveness draws on a more top-down perspective as it addresses overall goal fulfillment. A structure might be efficient, but not effective; however, it is unlikely to find situations when it is the other way around. "A certain degree of efficiency is a necessary but not sufficient condition for effectiveness" (Abrahamsson 1993, 108). For theoretical reasons and for the sake of exploring the question of how structure relates to network performance, it is considered an important task to hold them apart analytically. The two qualities are handled differently in each empirical case study; still, the essential meanings are the same, which in turn enables a comprehensive analysis that lifts the discussion to a higher, general level in the concluding chapter.

5.2 Network Closure

A network characterized by closure is a well-connected network, either directly by virtue of the existence of many strong connections or indirectly through a common,

coordinating contact. While the former refers to the level of activity within the network, the latter designates the level of hierarchy (Burt 2000). In this thesis, network closure will be empirically identified by applying two network measures: *density* and *centralization*. However, in order to strengthen the validity of the interpretations and to ensure that the measures significantly reflect the notion of network closure, as it is understood in the theoretical framework (see section 4.2.1), complementary analyses applying a wider set of SNA-measures must be made. This process will be described later.

5.2.1 Density: The first indicator of network closure

Network density is perhaps the most basic and probably also the most recurring concept used within the branch of SNA. Most often, it is associated with a general notion of network cohesion. By dividing the actual number (or tie strengths) of connections by the maximum number of connections (or tie strengths) possible, a general density measure for the whole network structure is calculated (Scott 2000, 71)²⁰. Accordingly, a network in which all actors are completely connected has a density of 1.0, a network in which half of the links are present has a density of 0.5, etc. Network density provides information about the overall activity or, to refer back to the discussion in Chapter 4, it is a measure of the richness of the overall communication flow within social networks.

The denser the network is, the higher the level of closure is assumed, enhancing all the beneficial elements discussed in the previous chapter, such as an improved internal collaboration. However, several serious problems are associated with the suggested density measure. It might be questioned as to whether the measure really captures the network qualities it is intended to reflect. Actually, the issue of construct validity, addressing the appropriateness of analytical concepts, is somewhat problematic for this and many other quantitative network measures. A restricted amount of research has been conducted on the construct validity of the measures adopted by SNA researchers, attempting to answer this imperative question

²⁰ The ties might be valued when describing different tie strengths reflecting, for example, the frequency of interactions. The ties might also be either directed or undirected, which alters the formula of the calculation. However, the basic logic for how to calculate density remains the same.

(Wasserman and Faust 1994). Still, concerning density, the measure has been the topic of considerable debate, probably due to its widespread popularity. The shortcomings associated with its application have been both acknowledged and discussed by scholars such as Friedkin (1981) and Moody and White (2003).

In particular, two network qualities—size and the existence of subgroups—need to be considered when drawing conclusions based on density. If the identified limitations (i.e., the impact of size and subgroups) are appropriately taken into account, density will most likely be a good and also intuitively accurate measure of the structural quality referred to as network closure. Network size directly affects the interpretation. Friedkin (1981) argued that density should be disqualified as an indicator of cohesion in research designs comparing networks of different sizes as, under such conditions, similar levels of density might in fact describe dissimilar levels of structural cohesion. “It requires a larger value of network density to achieve the same degree of structural cohesion in a small [rather] than in a large network” (Friedkin 1981, 49). In other words, comparable levels of cohesion will be achieved at a lower density within larger networks. This fact illustrates the limited comparative validity of the concept and might accordingly be labeled as a classical “traveling problem”²¹ that occurs when the same empirical measure means different things in different contexts. Therefore, when analyzing the policy networks in this thesis, the size of the networks will be acknowledged.

Further, the presence of subgroups must be considered in accordance with the density measure. For example, a network can be structured as a single, cohesive set of actors, illustrated by a network with one or perhaps a few larger subgroups that share many members. The opposite image is a fragmented network, divided into several tightly knit core-groups with little or no communication amongst them. The configurations of subgroups strongly affect the interpretations that can be drawn based on density. For example, a network that consists of two very distinct subgroups might still generate a high density level as significant communication occurs within each subgroup. Despite this, the general level of cohesion within such structures should

²¹ For a discussion on comparative validity, see for example Denk (2001).

not be interpreted as high (Friedkin 1981). Therefore, the extent and characteristics of subgroups within the policy networks will be examined.

A subgroup analysis generally starts with an examination of the number of components and then moves on to an analysis of the presence of coherent subgroups within the components. A network made up of one component is a connected network with no isolated actors (Scott 2000). Considering the policy networks of this thesis, due to the methodological ideas regarding the unit of analysis (see Chapter 2), assuming that the networks consist of single components (i.e., all actors are connected by at least one link to the rest of the structure) is likely. However, subgroups will most certainly be found in the empirical settings. “[...] subgroups are subsets of actors among whom there are relatively strong, direct, intense, frequent, or positive ties” (Wasserman and Faust 1994, 249). Evidently, different qualities might indicate the existence of subgroups. Subgroups can be defined due to the mutuality of ties among its members, due to the closeness of its members, or based on the frequency of interactions binding the actors together. A common idea is that the members of a subgroup are somehow more connected to one another than to the remaining actors (Wasserman and Faust 1994). In this thesis, the presence of subgroups will be determined by adopting a comprehension of subgroups compatible with the first two notions presented earlier, mainly using the SNA measures *cliques* and *k-plexes*. A clique is a group in which all actors are connected and to which no other actor can be added without this property being lost. Accordingly, it is a matter of complete mutuality (Wasserman and Faust 1994). The definition of a clique is very strict; therefore, a complementary measure, *k-plexes*, is also applied. This measure allows for missing links within the subgroups (Scott 2000). Mainly based on these two measures, a subgroup analysis on the empirical networks will be performed. A core/periphery analysis might also be useful as a first indicator of a clique-structure. If a network has a core/periphery structure, it has a core of actors who are closely interconnected with links to the actors in the peripheral part of the structure. However, these peripheral actors are related to the core but not to each other (Borgatti and Everett 1999; Everett and Borgatti 1999).

Consequently, and as emphasized by SNA scholars, if density is analyzed in accordance to both size and subgroups, it might still be regarded as a useful measure of cohesiveness (Scott 2000; Wasserman and Faust 1994). Network density is the first indicator of network closure applied in this thesis. Here, one problem to consider is at what density levels might a network be interpreted as “closed”? This issue, however important, lacks an obvious answer. The final interpretation must be made in accordance to the context of each policy setting and by considering the status of other network qualities. A comprehensive analysis of the network structure as a whole is therefore essential. Although the method and tools provided by SNA are quantitative, the interpretations of these require a solid qualitative analysis. The discussion regarding density is a good illustration of this fact; however, this is also true for the other SNA measures applied in this thesis. This insight is also why the use of a qualitative analysis was emphasized as being of vital importance as a complement to the quantitative data in Chapter 2.

5.2.2 Centralization: The second indicator of network closure

The level of hierarchy, empirically measured by network centralization, is the second indicator of network closure. When a network is highly centralized, large variations occur regarding the level of activity among the involved, such as those illustrated by the presence of a strong coordinating unit. As such, a high level of hierarchy is assumed, which in turn is interpreted as a structure characterized by a high degree of network closure (Burt 2000). Such networks are considered indirectly well connected and are accordingly assumed to enjoy all the advantages and disadvantages associated with a closed structure. Studies, ranging back to the Bavelas-Leavitt experiments in the late 1940s and 1950s confirm the significance of acknowledging the overall network centralization when conducting network research, due for example to its impact on problem-solving processes (Borgatti 1997; Freeman 1978/79).

Whereas density reflects the proportion of ties present, centralization reflects their configuration, providing information regarding the extent to which the activities are dependent upon one dominant individual. Network centralization is calculated based on the centrality measures of each participating actor and addresses the varieties

among them. Thus, in order to explain its logic, the idea of individual centrality must first be elucidated.

With reference to the whole network, each one of its actors can be assigned different levels of importance, or centralities, due to the extent to which they participate in or dominate the networking processes. SNA allows for three ways to measure this feature: *degree*, *closeness* and *betweenness*. Degree centrality takes the number of direct connections into account, closeness centrality considers the distance of one actor to all the other actors, and the measure of betweenness rests upon the idea that the centrality of an actor depends upon the extent an actor is located “in between” two other actors (Hanneman 2004).

Thus, overall network centralization is calculated in two steps, disregarding the comprehension of centrality that is adopted. First, the centrality scores of each of the other participants is subtracted from the highest centrality score (i.e., the centrality score of the most central actor) and then summarized. Second, the result of the calculation is divided by the maximum possible sum of differences (Scott 2000; Wasserman and Faust 1994). In other words, the measure reveals the proportion of asymmetry or how “star shaped” the structure is, indicating how unequally connected the actors are. Figure 5.2 illustrates a network with the highest level of network centralization possible (100, expressed in percentages).

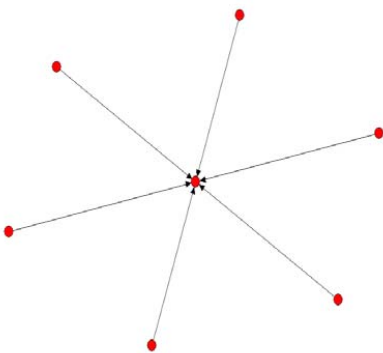


Figure 5.2 A Star Representing the Highest Degree of Centralization

The person in the middle of Figure 5.2 is the outermost central actor as the interactions are completely organized around this person. This is true considering all three images of centrality presented above. The star-shaped network is often used as a frame of reference when understanding network centralization. The other extreme, the circle, or the complete graph, reflects a network in which all actors are structurally equivalent; in such settings, the actors are equally connected, equally close to each other, and situated “in-between” other actors equally often.

Thus, although different notions of centrality exist based on degree, closure, and betweenness, this topic has been subject to debate. Scientific work to clarify how different measures are correlated and what kinds of advantages and disadvantages are associated with each of them has been conducted (see, for example, Bonacich 1987; Freeman 1978/79; Freeman, Roeder, and Mulholland 1979/80; Friedkin 1991). This work is important to consider, especially under those conditions (contrary to the one illustrated by Figure 5.2) when empirical data point toward completely divergent conclusions, depending upon the measure applied. All three notions reflect the structure of influence; however, “each addresses a different question that might be posed about the social structure of a group” (Friedkin 1991, 1480). A study conducted by Freeman et al. (1979/80) emphasized the particular advantage of the degree and betweenness measures, respectively (Wasserman and Faust 1994, 216). However, closeness centrality often correlates with degree centrality. Betweenness centrality is considered especially suitable for revealing the kind of power situations in which brokering and control of the flow of information are vital. Betweenness centralization is also regarded as “finer grained” than the other two (Freeman 1978/79, 237; Freeman et al. 1979/80). However, the decision regarding what measure must be made in agreement with the theoretical ideas adopted. The image of hierarchy determines whether the notion refers to “centrality as control, centrality as independence, or centrality as activity” (Freeman 1978/79, 237).

In this thesis, both degree centralization and betweenness centralization will be empirically measured and comprehensively analyzed. If the two measures tell different stories, it will be necessary to synthesize these results into a common picture. In fact, an interesting analysis might emerge based on such data. Thus,

because of the adopted notion of network closure, as defined in Chapter 4, degree centralization will be applied as the main empirical indicator as the overall degree centralization better responds to the idea of closure due to the fact that network closure was defined as a network that is either directly or indirectly well connected. Further, betweenness centrality is very sensitive for the presence of “lines” or long rows of actors within the network. Structures that contain many lines of actors have significantly high levels of betweenness; however, such a feature cannot be assumed to encourage a rich flow of information or resources within the policy networks. Thus, it must be emphasized that each empirical network requires a comprehensive analysis before drawing any conclusions. The visual graphs presented herein contribute to this task (cf. Figure 5.2). The theory underpinning different centrality measures and the research on their application are important tools in this process and must be used wisely.

To conclude, in this thesis, density and centralization will be used as the main empirical measures indicating the feature of network closure. A comprehensive analysis, primarily based on the two measures, will contribute to a general understanding concerning the level of closure within each of the policy networks included in the forthcoming empirical part. The theoretical discussion in Chapter 4 reflected how well integrated the networks are. A high density level secures the flow of communication, facilitating bargaining and joint action. However, communication and collaboration might also be channeled through a central coordinating actor, which is why higher levels of hierarchy point toward integration. Both measures reflect aspects of a closed network; according to the theoretical assumptions, this network feature affects the internal process of organizing and the performance of policy making. As previously cited, Burt (2000, 398) specified the importance of closure for “[...] realizing the value buried in the structural hole.” Thus, the logic for interpreting the data is as follows: the higher the levels of density and centralization, the higher the level of closure assumed.

5.3 Network Heterogeneity: Reflecting bridges over global structural holes

The level of network closure, as previously discussed, illustrates a central feature of the local structures of policy networks. The other network characteristic subjected for analysis in this thesis (i.e., the level of bridges crossing global structural holes) refers to the wider structure surrounding the networks and reflects how the policy networks are connected to other network constellations. As a consequence of the methodological choices made, the concept of *heterogeneity*, measured by the *diversity of actors* and the level of *cross-boundary exchange*, will be applied as empirical measures of this feature. This line of action is addressed next.

5.3.1 The Diversity of Actors and the Cross-boundary Exchange

The “name-generating” procedure, applied in this work to collect the relational data, considerably restricts the possibility to obtain information about the global network structure because the method only captures the stronger ties (Lin 2001). For the sake of mapping policy networks, this limitation is not a problem since the very definition of policy networks implies that such networks consist of stronger ties (i.e., reflecting the repeated and more stable interactions) (see Chapter 2). This is also a consequence of the adopted comprehension of the analytical unit. At the same time, the ties constituting the bridges, connecting actors on different sides of global structural holes, are presumably weaker (Granovetter 1973). Consequently, the data generated by the snowballing technique are appropriate for the task of defining the relevant analytical unit; however, they are not able to capture the global structure of the policy networks. Thus, the theoretical notion about the global structural holes must be transformed to better fit the methodological approach of this thesis.

Following this, the level of bridging must be examined using a different approach in this thesis by applying the concept of network heterogeneity. Network heterogeneity refers to the diversity of actors, but it is thought to reflect the existence of bridges and be an indicator of diversity in a more qualitative sense. Actors who differ due to some important aspects, such as belonging to different sectors of society or representing various professions, are assumed to possess different kinds of resources (see the discussion about the importance of structural holes in Chapter 4). The underpinning

logic is that, the more diversified set of actors a policy network consists of, the more bridges are assumed to exist.

Heterogeneity is a powerful quality and has fruitfully been related to performance by, for example, Reagans and Zuckerman (2001). A common denominator is that actors with dissimilar backgrounds or dissimilar organizational identities presumably contribute to a richer supply of new resources—an advantage that is associated with the structure (i.e., through links to other network constellations). In the current thesis, this feature will be measured in two ways. First, the organizational identity of the actors will be considered by examining, for example, how many scientific disciplines or what kinds of professions are represented in the process. Next, the cross-boundary nature of the interactions will be studied to determine whether the policy network interactions really bridge borders, as measured by the proportion of cross-boundary exchanges. In sum, given the limited ability to map the global structure of policy networks as theory ascribes, attribute data about the involved actors and their interactions will be used as indicators of heterogeneity; the more heterogeneous the set of actors, the more the network is assumed to span or bridge global structural holes. As such, the theoretical ideas regarding high performing networks are adjusted to the approach of this thesis—see the theoretical argument proposed in Chapter 4 about these types of structures securing “the source of added value” in the process of policy making (Burt 2000, 398). Thus, heterogeneity is determined as a feature thought to promote the important process of resource mobilization in policy making (see section 3.2).

At this junction, it should be clear how central measures are used in the thesis: while density and centralization will be used to determine the level of network closure, network heterogeneity, measured by the diversity of actors and the cross-boundary interactions, will indicate the presence of bridges over global structural holes. Other SNA measures, visualizations and graphs, as well as qualitative interview data will enhance the validity of the conclusions drawn.

5.3.2 Concluding the Theoretical Part of the Thesis

This section brings to a close the theoretical part of this thesis. In the subsequent chapters (Chapters 6, 7, and 8), the case studies will be analyzed. The theoretical ideas and related propositions will be applied and tested in the creation of new knowledge areas, in the establishment of a regionally based research school, and in the achievement of adaptive fishery resource management.

Hence, the general hypotheses regarding the relation between network structure and network performance, presented in the end of Chapter 4, can now be empirically tested based on the operationalizing of the concepts carried out in this chapter. The hypotheses are restated here.

- H1. The network structure matters for policy making within policy networks and affects performance, in terms of their efficiency and effectiveness.

More specifically,

- H2. Two central network qualities—namely, network closure and network heterogeneity —have an effect on performance in terms of their efficiency and effectiveness. Although heterogeneous networks are rich in resources, network closure is critical for the use of the resources obtained.

Consequently,

- H3. A high performing policy network is a heterogeneous network with a high level of network closure. This is empirically indicated by a network structure that is dense and centralized and contains a diversified set of actors involved in cross-boundary interactions. Variations in performance might be related to varieties in these network qualities.

CHAPTER SIX

Case I: Policy networks for new knowledge areas within the higher education sector

The context in which higher education policy is produced is in many respects typical for the modern welfare state and what is acknowledged in the general ideas related to the governance framework. In Sweden, decades of rapid expansion and the recently imposed decentralization have created a complex policy setting characterized by multiple levels of policy making and blurred multi-actor structures (Bauer et al. 1999; Frihet, Ansvar, and Kompetens 1992; Fritzell 1998; Marton 2000). These features are distinctive in public administration in general; external as well as internal conditions have made these features particularly evident within the educational sector (Bennich-Björkman 1997; Ehn 2001; Niklasson 1996; Nordisk konferens: universitet och högskola i förändring 1994; Söderström 1992). In this loosely coupled system (Weick 1976), the actors involved in the policy process are many and the responsibility is broadly spread. No given hierarchy or authoritative power in control of the policy processes exists (Löfquist 1999; Municio 1987). Nevertheless, higher education policy is created within this messy system. In this chapter, five policy networks—presumably formed as a result of an ambition to form innovative institutional arrangements within this system—will be studied²².

6.1 Institutional Change and an Increased Relevance of Local Strategies

The transformed relationship between the state and universities has resulted in a redefinition of the institutional arena of higher education policy. A reform with far-reaching implications for the status of this relationship was implemented in the early 1990s and was very much in line with contemporary ideas about self-regulation that

²² This chapter is based on material previously presented in a Licentiate thesis (Sandström 2004b).

permeated most areas of public administration at the time. Self-regulation, quality evaluation, and quality audits became keywords describing the link between the state and the universities (Högskoleverket 1996, 1998a; 1998b). In fact, the intentions and realization of that reform have appropriately been described as “a textbook case of change from a ‘State Control’ to a ‘State Supervision’ model” (Bauer 1996, in Bauer et al. 1999, 183).

The institutional change amplified the level of competitiveness of the system, and arrangements for funding were rearranged. For example, the resources related to undergraduate education became directly connected to the outcomes, as measured by the quantity of student admissions and students’ performances. The organization of research funding was also transformed, encouraging larger, multidisciplinary projects. These new principles for allocating resources intensified the struggle for funds, both within and between academic institutions (Bauer et al. 1999; Fritzell 1998). Accordingly, these institutional changes significantly transformed the conditions for managing Swedish universities. One consequence of the shift was that local level policy making gained increased strategic importance for the universities hoping to maintain their positions within such stiff competition.

All universities are, according to national regulations, required to adopt local strategic policy programs (Högskolelag 1992, 1434 §4). In the spring of 1999, such a working process was initiated at Luleå University of Technology (LTU); this process constitutes the case study of the current chapter. The process resulted in a program that expressed the ambition to achieve extensive changes (Det Skapande Universitet - en Mötesplats för Integrerat Kunskapsbyggande 2000). The purpose of the program was to provide a common vision that could lead the organization successfully into the future as it sought to achieve its newly declared goal: to become a university for “integrated knowledge formation” by 2006. Achieving this goal required adopting a new perspective on the creation of knowledge and encouraging and creating more interfaced learning across different disciplines and faculties. The essential idea of the strategic change was to establish an organization in which both the physical environment and the organizational culture would encourage and provide opportunities for innovative knowledge construction. To be more precise, the

program suggested a reconstruction of the processes related to research and education. These processes were to be rearranged into a number of integrated, multidisciplinary organizational units. Within each unit, a wide range of scientific disciplines would meet in order to focus on specific complexes of research problems. The research orientation, rather than the disciplinary or administrative borders, would be the organizing principles. Traditional borders between scientific disciplines would be bridged, and new innovative structures rebuilt.

After a series of workshops involving numerous actors, the University Board of Directors at LTU identified a set of broadly defined areas of research on which to focus, including global resources, communication technology, and network economy. Development of the selected knowledge areas started immediately after the Board of Directors adopted the program in the fall of 2000. The expected results were the establishment of a set of well-integrated knowledge areas, called arenas, that would combine research from different disciplines and offer both undergraduate- and graduate-level education in a cross-boundary and multidisciplinary academic environment.

Two persons were tasked with the role of project managers, assigned with leading the operational work in the creation of new arenas. People from different departments and disciplines worked together in networks to reorganize the university into these new arenas. Thus, self-organizing networks emerged; they were not authoritatively composed by the management. Despite the fact that all networks had been given the same instructions and economic prerequisites, the processes evolved in highly different ways. While some networks successfully managed to bring about organizing with innovative results, others experienced problems or even failed in their mission. The goal of this chapter is to explore these variations in performance.

6.2 Aim

This case study is concerned with a policy process related to a local strategic policy program at LTU. Five processes and their related policy networks that aim to develop innovative multidisciplinary organizational units for education and research are of central interest. A multiple case study design is adopted, addressing the variations in

outcomes from a comparative approach. The study is guided by the following questions:

1. Does a relationship exist among the network structure of the policy networks, their organizing capacities, and their performance in terms of efficiency and effectiveness?
2. If so, does the relationship correspond to the assumed importance of network closure and heterogeneity emphasized in the theoretical framework?
3. Do other relationships exist between network structure and network performance that ought to be acknowledged?

The multiple case study design provides a fine opportunity to examine the hypothesized relation between network structure and performance. The presumption is also that new hypotheses regarding the connection among networks, organizing, and outcome can be generated. Thus, the goal of this first empirical chapter is to test as well as further refine the ideas regarding the network structure of high performing policy networks (see section 5.3.2).

6.3 Case Study Design

The case study design and the logic for interpreting the data are illustrated in Figure 6.1. The boxes labeled Network A to Network E represent the policy networks (i.e., the independent variables of the design). The outcomes of the policy processes, the dependent variables, are presented to the right in the figure. Performance is determined by the ability to create new and innovative arenas, indicated by the notions of efficiency and effectiveness (see section 5.1).

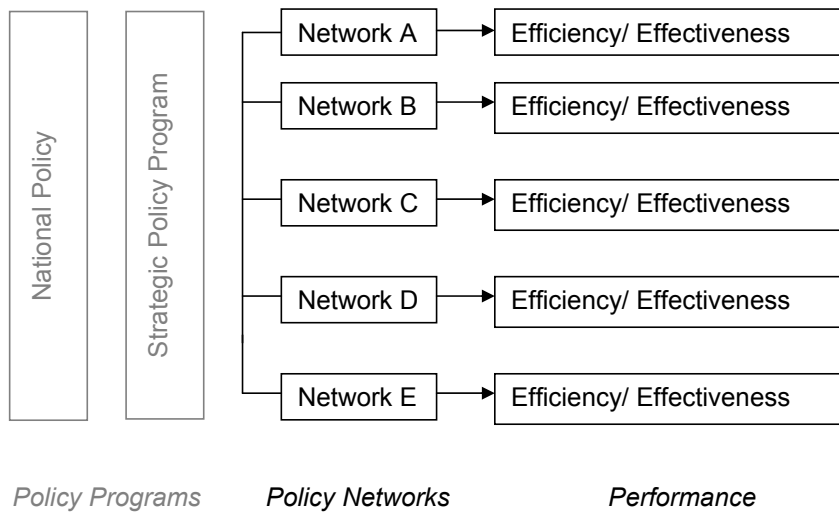


Figure 6.1. Case Study Design

The establishment of arenas and the time required to do so separate the efficient networks from the inefficient ones. Thus, networks that manage to create new organizational arrangements in a short period of time are considered more efficient than others. Time is thought to reflect how well the processes of collaboration, bargaining, and mutual adjustment progress. Considering the large amount of resources channeled through such projects, time is certainly a matter of resources; therefore, efficiency in the sense of fast implementation is a virtue. Effectiveness, on the other hand, relates to the qualitative aspects of collective action. Here, the extent to which the arena represents a newly introduced concept is examined. This perspective is important since the encouragement of innovative concepts was part of the overarching policy intention expressed in the program. These aspects, which determine the performance variables, will be studied using the interview data as a basis of information.

The network properties of the policy networks (i.e., the independent variables) will be examined by focusing primarily on network closure and network heterogeneity as identified, discussed, and operationalized in Chapters 4 and 5. The networks will be compared and ranked in order to characterize the status of their overall structures.

The first four cases (Networks A through D) in Figure 6.1 have all resulted in arenas²³. This begs the question as to what the common features among these networks are? Variations also exist among these more successful cases; these differences will be addressed. Could variations in network structure be related to different levels of efficiency and effectiveness, respectively? A completely contrasting case (Network E) is added in order to reinforce the research design. This network reflects a process that has not accomplished any integrated knowledge area or arena. Network E is contrasted to and compared with the other four in order to identify dissimilarities. Does the network structure of Network E depart from the other networks in any central aspects? Thus, both logics of replication (see Chapter 2) are embedded in the design.

Since all five networks are developed in a similar context, the external factors are not given any prominent position in the research design (see the soft grey boxes in Figure 6.1). Instead, it is the relationship among network structure, organizing, and performance that is of interest; the comparative approach is thought to elucidate the possible connection among these variables (see section 3.3.3). In other words, what are the similarities and dissimilarities between the network structures? Are these variations related to the variations in outcome?

6.3.1 Data Collection

A wide range of data, including official documents, archival records, questionnaires, interviews, and observations, has been collected to support the empirical analysis. In addition, research literature, laws, and official regulations as well as reports on the subject of higher education policy have been reviewed in order to grasp the context in which the university is situated and learn about the external constraints and internal conditions that shape the setting of the policy arena.

The process of data collection was conducted in relation to an evaluation project tasked to follow and give feedback to the strategic work. The project was led by an evaluation group and assisted by three Ph.D. projects (Edzen 2005; Holst 2004; 2007;

²³ In other words, the University Board of Directors has given its permission to accept students into the arena.

Sandström 2004b). The evaluation process also resulted in reports on different aspects of the strategic change that were addressed directly to the evaluation group (Edzen, Holst, and Sandström 2003; Sandström 2003; 2002²⁴). Altogether, this work procedure has generated a solid knowledge base concerning the policy area in general and the strategic work at LTU in particular.

6.3.2 Learning about the Policy Networks

Interviews and questionnaires were conducted to learn about and reconstruct the organizing networks. The time period objective for analysis diverges among cases. Considering the successful networks (Networks A through D), the whole process—from the first idea of the knowledge area was articulated and acted upon until the arena was established—is analyzed. The contrasting case (Network E) was studied from the time of initiation until the spring of 2003, when no start decision had yet been taken.

The snowballing interviewing started with two persons within each knowledge area who had taken on the role of coordinating the processes. Altogether, 36 interviews were conducted, two by telephone and the remainder in face-to-face situations. The respondents were initially contacted either via telephone or e-mail; practically all actors responded positively. Not one person openly turned down the request to participate in the interview study. The interviews lasted 30 to 90 minutes and were semi-structured with reference to a set of common themes based on the organizing functions discussed in Chapter 2 (see Appendix B). The interviews were recorded, and the material was transcribed for qualitative analysis²⁵. All respondents were offered the opportunity to read the notes and comment on/complement the information. The issue of confidentiality was discussed with all respondents.

²⁴ The process was described chronologically, from its initiation to the actual stage of implementation (Sandström 2002). A questionnaire that included questions about the attitudes toward the new strategy and the respondents' level of participation in the implementation of it (Edzen et al. 2003) was handed out to all employees. The data from the interview study, supporting this chapter, were analyzed and compiled in a report describing the qualitative features of the processes (Sandström 2003).

²⁵ Due to technical problems, five interviews were not taped, but notes were taken for analysis immediately after the sessions.

The social network data were collected through a questionnaire. In total, 106 questionnaires were sent out to all actors mentioned during the interviews; 105 answers were received. The respondents were asked to indicate the persons with whom they had discussed the development of arena X and mark the box that best describes the frequency of the discussions. Respondents had a choice of “several discussions,” “occasional discussions,” and “no discussions at all” (see Appendix C). The respondents could also add to the list of names. Thus, in the analysis of data, only the first choice, indicating the more recurrent contacts, was used. This course of action is thought to enforce both the validity and reliability of the data (see the discussion in Chapter 5).

The data was imported in UCINET6, creating a DL file using the linked list format, *odelist1*. The data set generated a matrix of asymmetric data (i.e., ties are directed and might, or might not, be reciprocated). Each relationship indicated by the respondents is given the value of 1. The visualizations of the networks were created in Netdraw (Borgatti 2002).

6.4 Network Performance²⁶

The networking processes associated with the creation of new knowledge areas were recapitulated and analyzed using the four organizing functions as a frame of reference: problem definition, prioritization, mobilization, and evaluation (see Chapter 2). The performance of each network was determined based on the answers to the following questions: Did the process result in the realization of an arena? How much time did the process take? (efficiency-related questions) Does the arena represent an innovative and newly introduced concept? (effectiveness-related question). The empirical data gained from the interviews that describe the distinguishing features of the organizing activities and their performances are summarized in Table 6.1.

²⁶ The inferences made in this section are deduced from texts containing more detailed descriptions of the working processes (Sandström 2003; 2004b). Only the general features of the organizing processes are relevant in order to fulfill the purpose of this chapter; therefore, the processes will be described on a general level. The citations in the text should be acknowledged as mere illustrations of the conclusions drawn based on the material.

Table 6.1. Organizing Features and Performances

<i>Policy Networks</i>	<i>Distinguishing Organizing Features</i>	<i>Efficiency</i>	<i>Effectiveness</i>
Network A	<ul style="list-style-type: none"> • Easy processes of prioritizing based on a preexisting concept • No experienced need for additional resources 	(1) High The arena was established in August 2001.	(3) Low The arena was based on an existing educational program
Network B	<ul style="list-style-type: none"> • Shifting priorities and struggles with resources were overcome halfway through the process 	(1) High The arena was established in August 2001.	(1) High A new structure launched a new concept
Network C	<ul style="list-style-type: none"> • Easy process of prioritizing partly based on existing collaboration • Unproblematic resource-mobilization process 	(2) High The arena was established in January 2002.	(2) Moderate/High The concept originated in prevailing collaboration projects
Network D	<ul style="list-style-type: none"> • Difficult prioritization process • Unproblematic process of resource mobilization 	(3) Moderate The arena was established in August 2002	(1) High A new structure launched a new concept
Network E	<ul style="list-style-type: none"> • An unsuccessful process of problem definition and prioritization • Serious lack of resources 	(4) Low No result was achieved.	—

The five networks are first compared regarding their level of efficiency. Networks A through D all successfully resulted in the establishment of arenas. However, they differ in the time it took to achieve this. Meanwhile, Network E never achieved its goal. Based on this information, the networks in Table 6.1 are characterized as highly, moderately, or lowly efficient. The networks are also ranked, from 1 to 4, where 1 represents the knowledge areas that first got the permission to start.

Some distinguishing features appear when the organizing process of the least efficient network, Network E, is compared with the other four. First of all, Network E

involved an unclear process of problem definition with an ever-changing purpose. For example, should the work be directed against either research or educational matters? What research problem should be the focus and from what scientific angles should this problem be illuminated? These important questions never got any definite answers. As expressed by one of the respondents: “the concept of the knowledge area has been constantly modified, depending upon the persons involved”. Both the research problem and the scientific disciplines to be included in the knowledge area were constantly questioned and redefined. Thus, the network reflects a complicated and poor prioritization process.

The actors involved in Network E were neither strongly committed to the work nor shared any common idea about what to do and how. According to one respondent, “I met a lot of people, interviewing them, but felt that it was difficult to obtain their support.” Furthermore, the constellation of actors that evolved in accordance to the process did not possess the resources necessary, such as scientific expertise, for realizing their goals. They also experienced severe difficulties in mobilizing them: “It was hard to engage people. Those who took part did not possess the competence needed.” Encouraging support from the project management was lacking. The actors could not, or chose not to, respond to the feedback from higher levels of authority within the university: “We thought our plan was satisfactory, we could not see any weaknesses ourselves.” Another respondent said, “We did not understand what was wrong with our plan and questioning our ideas was not rational in any way.” These comments suggest that the working process of Network E also lacked a proper evaluation function. However, the various ideas concerning the concept of the knowledge area that were suggested during the process might be regarded as highly innovative, trying to achieve a research orientation not present within the university. Thus, the insufficiency in collective action blocked the realization of the proposed ideas.

Network A can serve as an illustration of a completely contrasting policy process, distinguished by its high efficiency (see Table 6.1). The problem definition and many of the priorities concerning the basic concept of this knowledge area had actually been worked out before the strategic change was imposed within the university: “We

saw [the strategic work] as an opportunity to realize the idea and to do our thing within a knowledge area.” An established idea existed on which to build as a newly introduced education program, largely built on the same research area, functioned as a prototype. Many of the actors involved in Network A had taken part in that previous work. The initial stage of problem definition related to this knowledge area might in fact be characterized as a “garbage can” decision-making process (Cohen, March, and Olsen 1972; Jones 1995) in that an already defined idea found its solution in the ongoing strategic work at the university.

Further, the actors involved in Network A were strongly committed to the idea. This mutual understanding facilitated the whole process of implementation, from prioritization to evaluation: “We were visionaries. We were deeply engaged and committed to the idea and full of enthusiasm.” Another respondent said, “Everyone in the group agreed about what we were trying to achieve and why, and we also managed to argue for our idea in a positive way.” The initial actors possessed the essential resources needed; therefore, no real need existed to mobilize new actors in order to realize the arena. When talking about the established priorities, “it was very much up to the group of people that had been put together to start the work.” The shared commitment also served as an evaluation mechanism, ensuring the actors that they were heading in the right direction; moreover, they gained positive feedback from the project management. “The positive attitude towards us was encouraging, and [the project management] supported us in practical and financial matters.” Accordingly, given the fact that this knowledge area became one of the first arenas to start, the network is regarded as highly efficient. However, the low level of innovativeness makes it appropriate to question its performance. “Our work aimed at opening up a system, rather than creating something new.”

The remaining cases, Networks B, C, and D, are also considered efficient (see Table 6.1). Certain general features appear in all the processes that successfully managed the task of realizing an arena. First, these networks were all comprised of motivated actors with a strong commitment to the strategic work. Apart from the commitment to the ideas exemplified above, more pragmatic motives existed as well. “We needed money for the division, and the work was important, given the research profile of our

division.” A common view regarding the general concept evolved. Relevant actors agreed on the importance of getting started. The process of prioritizing within Network B, C, and D has, however, been somewhat more problematic than in the case of Network A. Divergent ideas about the more specific directions and the content of the areas of research were expressed and, in some cases (especially in Network D), many strong-willed individuals struggled side by side. “A frustrating process, there were a number of ideas and committees. Just as the work had progressed, new people showed up and we had to start all over again. It took a long time, because so many people were involved.” However, the common denominator is that these difficulties were solved through compromises. By bargaining and negotiating, the actors adjusted to the goals and interests of others. “In order to keep the work on track everyone had to get something in return.” In other words, the common agreement on the importance of realizing the arenas outweighed the difficulties experienced. Yet Network B departs due to the fact that final priorities essentially were achieved by a change in central positions; the network was altered halfway through the process. Actually, the development of Arena B is a story about two separate working processes.

Another common feature of the networks proven capable of realizing the arenas was the availability of the appropriate resources. “We dropped all the ideas when the needed competence was not available.” At times when resources were lacking, the capacities to mobilize them were present: “My contact net has increased radically” and “I know an awful lot of people, both on a management level, within the central administration and in various departments.” The strong commitment to the realization of the arenas and the achievement of consensus within these groups also functioned as evaluation mechanisms on a more regular basis. “We had a mental picture about what to do and about the desired content of the arena.” Although these capacities are apparent within Networks A through D, they are absent in Network E.

Accordingly, two qualitative features of the organizing processes seem to be positively correlated with the level of network performance—namely, the spread of a common belief concerning what to do and how (compared with the organizing function termed *prioritizing*), and the ability to mobilize necessary resources

(*resource mobilization*). These two qualities facilitate organizing processes and, thus, network performance. Similar inferences have been suggested by Carlsson (2000) and Zafonte and Sabatier (1998), among others.

The differences among the networks in regards to their levels of effectiveness, measured by their ability to produce innovative results, have already been briefly touched upon. Table 6.1 characterized the networks as being highly, moderately, or lowly effective. The interpretation is based on whether the arenas represent newly introduced concepts or not. The networks are ranked, where 1 represents the highest level of effectiveness, etc. Once again, Network A is the divergent case. The preexisting concept and the mobilization of a preexisting structure of actors can be contrasted to the other processes. Network D, for example, represents a new structure launching a new concept. This is also true for Network B. However, Network C is interpreted as moderately effective since the knowledge area was introduced within an already existing structure, although the concept became significantly modified as the process continued. “The arena is a development of the ideas from previous work within the academy, accompanied by some new ideas regarding ‘the network society.’” It should be noted that the networks characterized as being more innovative also struggled with somewhat more complicated prioritization processes, demanding solutions that required additional, more complicated negotiations, as illustrated by some of the citations in the text above.

Concluding this section, the dependent variables in the analytical scheme have been worked out. The performance of the policy networks have been analyzed according to their level of efficiency and effectiveness, and certain distinguishing features of the processes of organizing has been worked out.

6.5 Network Structure

In this section, the qualities of the policy networks are mapped and analyzed, providing the necessary information regarding the independent variable of the design. Using social network analysis, questions regarding the level of network closure and heterogeneity will be answered. How can the described networks be characterized in terms of network structure?

6.5.1 Network Closure

As previously emphasized, network closure is regarded an important quality of a network. Network closure is indicated by density and centralization. The density measures of the five networks are presented in Table 6.2, together with the network sizes, describing the number of actors involved in each network.

Table 6.2. Network Size and Density

<i>Policy Networks</i>	<i>Size²⁷ (Nr)</i>	<i>Density²⁸ (d)</i>
Network A	18	0.25d
Network B	18	0.25d
Network C	42	0.16d
Network D	37	0.11d
Network E	19	0.15d

The networks can be separated into two main groups according to size, with two large networks (C and D) and three smaller ones (A, B, and E). Consequently, the interpretation regarding the level of cohesion will be conducted by comparing networks of similar sizes (see section 5.2.1). For example, Networks A, B, and E will be compared amongst each other, implying that knowledge area E diverges due to its lower density. Although 25 percent (0.25d) of the possible links within Networks A and B were present, only 15 percent (0.15d) were present within Network E. The two larger Networks, C and D, also differ; the former has a density of 0.16 while the latter's is 0.11. In regards to density as an indicator of structural cohesion, Friedkin (1981) argues that there is a dramatic increase in structural cohesion within the lower density interval (i.e., ranging from 0.0 to 0.5d). Using this as a reference, the

²⁷ The questionnaire was sent out to 106 actors. The sizes of the networks in Table 6.2 reflect the number of actors reported as involved in "several" discussions concerning the development of the selected knowledge areas. Some actors were identified as isolates and thus removed from the analysis. The final number of total actors, in the four networks combined, is 134—a number that is explained by the fact that the respondents were given the opportunity to add new names to the list.

²⁸ Density was calculated based on the asymmetric set of raw data.

cohesion within Network C is considered higher than in Network D. Different levels of density reflect different levels of activity within the studied policy networks.

To further enhance the comparability, the subgroup structures were examined, starting with the core/periphery structure of the networks. Network B distinguished itself. Contrary to the other networks, this one had a small core while a substantial amount of the activity seemed to be occurring outside this inner group. This information suggests that the network in question might, in fact, be made up of different clusters. This presumption is verified by an analysis of cliques and k-plexes. This type of subgroup structure does indeed complicate the task of drawing conclusions based on the density measure. In Figure 6.3 the structure of Network B, considering only the stronger and reciprocated ties²⁹, is illustrated. This procedure is applied for the sake of exploring the stronger and more stable structure of the network and to reveal whether the assumption about the existence of a subgroup structure is correct. The analysis is unambiguous, showing a network divided into two distinct subgroups (Figure 6.3).

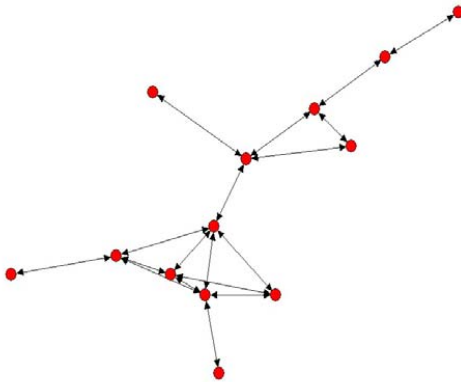


Figure 6.3. The Subgroup structure of Network B

Based on the qualitative interview data, it is possible to state that the two subgroups reflect the two sets of coordinators that have been responsible for managing the work (see the discussion about the working process in section 6.4). Accordingly, density is

²⁹Reciprocity (i.e., ties going in both directions) is sometimes used to reflect the stronger ties within a network (Friedkin 1980, 413). It is thought to reveal the stable structure of a social network.

not an appropriate indicator of coherence in this case. The high density measure (0.25d) does not necessarily reflect a comparative level of cohesion as a large amount of the activity is carried on within distinct subgroups and not in between. For the sake of securing the possibility to make theoretical generalizations on the basis of the collected data, this network will be excluded from the forthcoming analysis. The network is not suitable for comparisons given the research design adopted in this case study. Table 6.3 presents the centralization measures of the remaining policy networks.

Table 6.3. Network Centralization³⁰

<i>Policy Networks</i>	<i>Degree centralization (%)</i>	<i>Betweenness Centralization (%)</i>
Network A	62	16
Network C	51	13
Network D	38	23
Network E	40	15

The level of hierarchy can be worked out by ranking the networks according to the two measures: degree centralization and betweenness centralization. The most prominent networks are Network A and C, with the high degree centralization scores of 62 and 51 percent, respectively. The activities have been tightly connected around some central actor, indicating high levels of hierarchy.

These networks are, in comparison with the others, more ‘star shaped’ (see Figure 5.2). In contrast, Networks D and E have lower degrees of centralization and can, therefore, be described as constellations with more horizontal structures. The

³⁰ When calculating degree centralization, the choice of treating the data as symmetric was chosen, reflecting the overall communication structure of the underlying policy structures. This means that the very existence of a link between two actors, disregarding its direction and whether or not it is reciprocated, is recoded as a 1.

betweenness centrality scores are low for all networks. Network D is distinguished by a slightly higher value.

6.5.2 Conclusions Regarding Network Closure

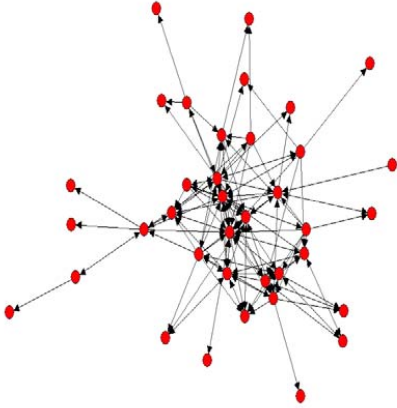
Table 6.4 summarizes the data concerning the level of network closure. In the last column of the table, after a comprehensive analysis of all three social network measures, an interpretation of the general levels of network closure is presented. Based on the data, the higher the levels of network density and centralization, the higher the level of network closure.

Table 6.4. Network Closure

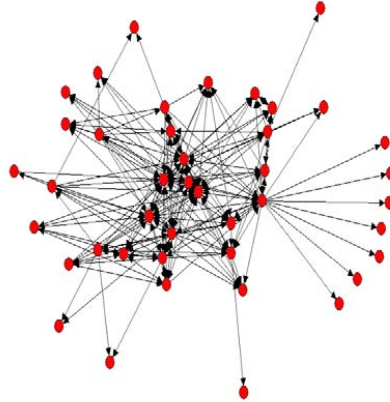
<i>Policy Networks</i>	<i>Density (d)</i>	<i>Degree centralization (%)</i>	<i>Betweenness Centralization (%)</i>	<i>Network Closure</i>
Network A	0.25d	62	16	High (1)
Network C	0.16d	51	13	High (2)
Network D	0.11d	38	23	Low (4)
Network E	0.15d	40	15	Low (3)

The networks in Table 6.4 can be separated into two groups. Networks A and C are both characterized by their higher levels of closure, meaning that the actors are both tightly interconnected and hierarchically ordered. Networks D and E, on the other hand, are more loosely connected, and the division of authority is relatively evenly distributed. The particular networks are visualized in Figure 6.3 in order to reinforce the analytical conclusions made so far.

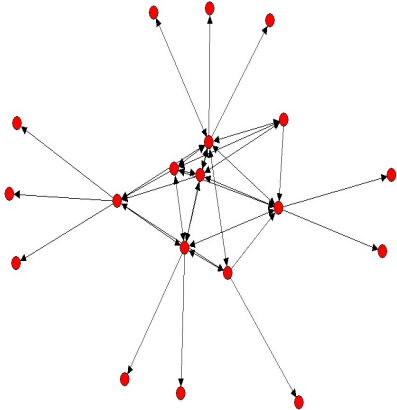
Network D



Network C



Network E



Network A

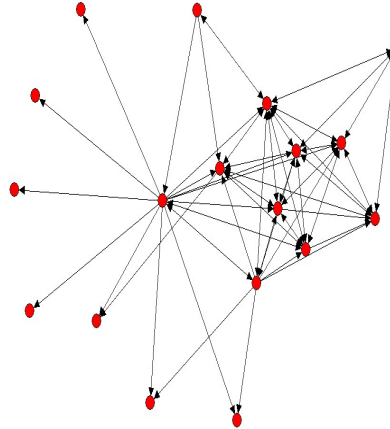


Figure 6.3. Visualizing the Networks

The networks with lower levels of closure are presented to the left in Figure 6.3, while those with higher levels of cohesion are shown to the right. Comparing the two larger networks situated in the upper row, it becomes obvious that the level of activity within Network C is remarkably higher than that in Network D. More links connect the actors of Network C. Thus, the fact that the centralization score within this network also is remarkably high might not be as easily comprehended from the graph.

The data regarding the level of closure within the four policy networks are also verified by the qualitative information gained from the interviews. For example, the structural feature of Network C corresponds very well with the reported information. The respondents related to Network C named many actors during the interviews, and it became clear that the work had been coordinated by a smaller group of people. The only question that arose in comparing the SNA data with the information gained from the interviews was whether Network D was somewhat less hierarchically structured than what would be expected from the interview study. However, altogether, significant compatibility exists between the two types of data sources, confirming the conclusions made.

6.5.3 Network Heterogeneity

The second network feature of interest here is the level of network heterogeneity, which is believed to reflect the existence of bridges over global structural holes. This feature is empirically captured by the number of different organizational/administrative units represented in the process and the proportion of ties crossing the borders between these units.

The actors can be separated into five different categories: the Faculty of Arts and Sciences, the Faculty of Engineering, the Special Board for Teacher Education, Administration, and External actors.³¹ The findings reveal that only Network C contains actors from all five categories. This network is the only one that successfully integrated representatives from the business and economic world outside the academic world. Networks A and D include actors from all four internal university categories, but lack the input provided by external actors. Network E distinguishes itself since only two Faculties are involved in the work. It does not include any representative from the administrative sector either. However, although this might be telling as a starting point, network heterogeneity needs to be studied through more refined categories. Therefore, the number of organizational units, departments, and

³¹ Representatives from the University Library were included in the group of Administrators. The External group included representatives from the business and industrial sectors and actors active through their commitment to organizations (like CDT, CDL) fostering collaboration between the university and the surrounding society.

divisions reflecting different scientific disciplines and subjects within each network is considered.

Table 6.5. Actors' Diversity

<i>Policy Networks</i>	<i>Departments (No.)</i>	<i>Divisions/Administrative units (Nr.)</i>
Network A	7	7
Network C	8	17
Network D	8	18
Network E	7	10

The number of broad administrative units is presented in the first column of Table 6.5. Each university department is considered a separate work unit. In addition, all administrative representatives are brought together as one category; this also applies to the external representatives. No distinctive differences emerge among the four networks. However, it is important to consider the large internal variations among the studied units. Some departments are fairly heterogenic in themselves, consisting of up to nine different scientific subjects or divisions, while others are more homogenously composed. Therefore, it is necessary to consider the number of divisions or administrative units. This analysis offers a better comprehension of the level of network heterogeneity. As evident in Table 6.5, Network A includes a comparatively low number of these units while Networks C and D are considerably more diverse.

However while attribute data expressing the organizational identity of the actors are considered, it could still be argued that the involvement of actors with divergent attributes do not necessarily reassure the existence of cross-boundary activities. The interactions might still take place among those actors sharing similar characteristics. Therefore, the cross-boundary activity is investigated and measured as a proportion of ties connecting people from different divisions. The percentages are given in Table 6.6.

Table 6.6. Proportion of Cross-boundary Ties

<i>Policy Networks</i>	<i>Cross-boundary Ties (%)</i>
Network A	29
Network C	54
Network D	61
Network E	50

According to the data presented in Table 6.6, Networks C and D stand out as the most cross-boundary structures, with 61 and 54 percent respectively. They are closely followed by Network E, in which half of the links were across borders. Network A is distinguished by its low proportion, 29 percent, of linkages spanning scientific boundaries.

6.5.4 Conclusions Regarding Network Heterogeneity

In Table 6.7, the two measures are presented, and an estimation regarding the levels of heterogeneity is made. As in the case of network closure, the overall conception of heterogeneity is based on a comprehensive analysis of both actor characteristics and cross-boundary exchange.

Table 6.7. Network Heterogeneity

<i>Policy Networks</i>	<i>Departments (No.)</i>	<i>Divisions/ Units(No.)</i>	<i>Cross- boundary Ties (%)</i>	<i>Network Heterogeneity</i>
Network A	7	7	29	Low (4)
Network C	8	17	54	High (2)
Network D	8	18	61	High (1)
Network E	7	10	50	Moderate (3)

All policy networks studied must be regarded as heterogenic since they bring together people from different scientific subjects and organizational units within, and outside, the university. However, differences are evident. Network A has a low level of heterogeneity, while Networks C and D are characterized by high diversity and, consequently, are assumed to span a large amount of holes in their global structures. Network E has a level of heterogeneity somewhere in between. One possible inference is that size is positively correlated to the level of diversity.

The social network data concerning heterogeneity might also be compared to the information provided from the interviews. For example, the heterogeneity aspect was captured based on how many organizational units were represented among the persons interviewed. Some variations among the networks were distinguished. Regarding this aspect, however, the tools provided by SNA give richer descriptions and are more accurate than the qualitative interview data.

As this section comes to an end, all networks have been analyzed regarding the two relevant network qualities, revealing their network properties based on closure and heterogeneity. Consequently, both the independent and dependent variables have been determined empirically. In the next section, this information will be related to what is known about their performance by investigating the relation between the two.

6.6 Network Structure and Network Performance

Recall the first two questions presented in the introduction of this chapter: Does a relationship exist among the network structure of the policy networks, their organizing capacities, and their performance in terms of efficiency and effectiveness? If so, does the relationship correspond to the assumed importance of network closure and heterogeneity emphasized in the theoretical framework?

Data concerning both the independent and dependent variables are presented in Table 6.8. What kind of inferences can be deduced from this information?

Table 6.8. Network Structure and Network Performances³²

<i>Policy Networks</i>	<i>Network Closure</i>	<i>Network Heterogeneity</i>	<i>Efficiency</i>	<i>Effectiveness</i>
Network A	High (1)	Low (4)	High (1)	Low (3)
Network C	High (2)	High (2)	High (2)	Moderate/High (2)
Network D	Low (3)	High (1)	Moderate (3)	High (1)
Network E	Low (4)	Moderate (3)	Low (4)	–

In regards to the issue of network efficiency, reflecting the capability of collection action, a clear connection exists between the level of network closure (networks with high level of activity that are hierarchically integrated) and efficiency. Both Networks A and B are characterized by higher levels of closure. At the same time, these networks are also significantly more efficient than the others.

Heterogeneity is the second network quality presumed to promote a better performance. How does network heterogeneity correlate with efficiency? Clearly, Network A—the least heterogeneous network—was also the most efficient one. It is also intuitively likely that heterogeneous networks, containing a diverse set of actors, need more time to establish a situation of joint action. Furthermore, it might be assumed that a network that contains actors with no previous experiences of cooperation is less efficient than one in which the actors and their agendas are well known to everyone involved. This would suggest a negative relationship between the two variables. However, this idea is not fully supported by the empirical data generated in this study and will therefore be left to speculations.

If success is defined as a network that is both efficient and effective, the latter associated with the notion of innovativeness, the inferences regarding the structure of highly performing networks go beyond the relevance of closure. Networks C and D are considered more innovative and effective than the others. Both of these networks

³² Since Network B is not included in Figure 6.8, the networks have been ranked only with reference to the remaining four networks.

are also characterized by higher levels of network heterogeneity. Innovation, and the ability to promote new lines of thinking and new concepts, seems to be positively correlated with the level of heterogeneity and cross-boundary interactions.

To enhance the transparency and reveal the logic of the empirical analysis, Figure 6.5 is constructed, based on Burt’s model (see Chapter 4), from the statistics presented in Table 6.8.

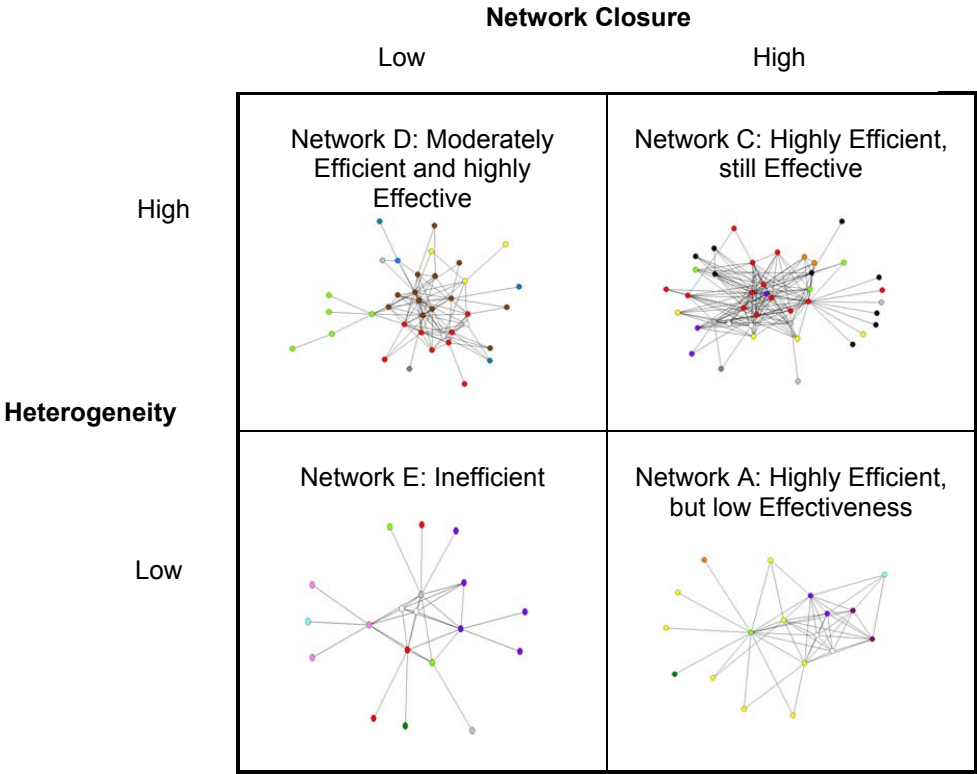


Figure 6.5. Empirical Data Concerning the Connection between Network Structure and Performance (based on Burt 2001, 48)

Each policy network (Networks A through D) is placed in the matrix according to its specific network properties. In addition, the social network data are complemented with information about their performances. Using this figure as a reference, the

central question can eventually be answered regarding within what kind of network structure are efficiency and effectiveness facilitated?

Based on Figure 6.5, a connection exists between the level of in-group closure and the efficiency of collective action since the most efficient networks are found along the right side of the figure. Both Networks A and C are characterized by higher levels of closure than the others. In agreement with this, it is proper to say that network efficiency is facilitated within well-connected and centrally integrated networks. Thus, the first tentative finding of this case study is that network closure seems to promote network efficiency. The hypothesis about the positive relationship between performance on one hand and local network closure on the other is thereby supported.

If based exclusively on Figure 6.5, effectiveness seems to be positively correlated to the level of heterogeneity. The degree of innovation increases how high in the figure the networks are situated. In order to create and introduce something new, a new network needs to be formed that brings together unfamiliar actors possessing dissimilar resources. Thus, the second finding of this study is that network heterogeneity seems to promote network effectiveness. The hypothesis suggesting a positive relation between performance and heterogeneity is thereby supported.

Accordingly, and to answer the first two questions outlined in the introduction of this section, a connection between network structure and performance does seem to exist. Network heterogeneity is a necessity for the creation of an effective network; its degree of efficiency is positively related to the level of closure. The finding goes hand in hand with the theoretical discussion in Chapter 5 and the general hypotheses adopted (see section 5.3.2). However, many unanswered questions remain concerning the nature of the relationship between structure and performance. One question addresses the function of the network qualities that have been ascribed such great importance: What is it really about closure and bridging that enhances the efficiency and effectiveness of policy networks?

6.7 Network Structure and Organizing Functions

The third question guiding the analysis of this chapter asked whether any other relationships exist between network structure and performance that ought to be acknowledged. This section examines whether it is possible to further refine the relationship between the two variables.

Chapter 5 suggested that, “while brokerage across structural holes seems to be the source of added value, closure can be critical to realizing the value buried in the structural hole” (Burt 2001, 52). The rich qualitative data concerning the features of the different working processes available in this empirical case study provide exceptionally good opportunities to study the relationship between closure and heterogeneity as well as the policy process.

The theoretical ideas about policy making, as a problem solving process captured by the performance and coordination of a set of organizing functions, have guided the whole research process, from the stage of data collection to the analysis of the specific networking activities. Thus, all five policy processes have been identified and analyzed with reference to how the network of actors defined the problem, how they made the necessary priorities, how the resources were mobilized, and how the networking actions were evaluated.

In accordance with theory, the ways in which these functions are carried out significantly affect the outcomes of policy processes. In section 6.1, in which the working processes were described and the performances characterized, it was found that two functions of the working processes were especially positively correlated with performance: the existence of a common idea about what to do and how to do it and the ability to secure and mobilize necessary resources in order to realize the proposed ideas. Such qualities were also related to the organizing functions of *resource mobilization* and the process of *prioritizing*.

This information regarding the distinguishing features of the five organizing processes may possibly function as a theoretical bridge and fill a gap by suggesting hypotheses that can explain why network structure affects network performance.

Accordingly, two questions are posed: Does a certain type of network facilitate the establishment of a common idea and a mutual understanding, facilitating the function of prioritizing? Does a certain type of network facilitate the ability to secure the resources needed? In other words, is resource mobilization and prioritizing promoted within certain types of network structures?

The empirical data support such a standpoint. Within the two networks sharing the highest levels of closure—namely, Networks A and C—the processes of problem definition and prioritizing were relatively easily carried out. In contrast, the actors within the remaining Networks (D and E) experienced poor or complicated prioritization; these networks were also characterized by lower levels of in-group closure (see Figure 6.2). Hence, a positive relation between closure and the process of prioritization is suggested.

The second hypothesis to be proposed is that a positive relationship exists between the mobilization of resources and heterogeneity. If one looks for networks that have successfully mobilized new resources, with the emphasis on new, one finds that those networks also are the most heterogeneous ones (see Figure 6.2). The proposed relations between the organizing functions and the network qualities are neatly illustrated in Figure 6.6.

		Network Closure	
		Low	High
Heterogeneity	High	The process of prioritization is problematic, while the process of resource mobilization is facilitated.	Both the processes of prioritization and resource mobilization are facilitated.
	Low	The process of prioritization is problematic, and it might be difficult to mobilize resources.	The process of prioritization is facilitated, while it might be difficult to mobilize resources.

Figure 6.6. The Relation between Network Structure and the Organizing Functions (similar ideas are presented in Carlsson and Sandström 2008)

When placed into Figure 6.6, the suggested relationship between prioritizing and closure on the one hand and resource mobilization and heterogeneity on the other becomes easily comprehended. Arguments emerge for both hypotheses, but they still need to be further tested. For example, one obvious question is how the organizing functions and their dialectical relationship to network structure (discussed in Chapter 3) affect one another in the process of policy making. Considering the time scale, is performance enhanced by a certain structure at a certain period of time in the policy process?

6.8 Preliminary Conclusions

This chapter examined policy networks concerned with the implementation of a strategic policy program at LTU. Five processes and related policy networks, with the aim of developing innovative multidisciplinary organizational units for education and research, were investigated. The variations in performance were studied from a network point of view. Three questions guided the investigation:

1. Does a relationship exist among the network structure of the policy networks, their organizing capacities, and their performance in terms of efficiency and effectiveness?
2. If so, does the relationship correspond to the assumed importance of network closure and heterogeneity emphasized in the theoretical framework?
3. Do other relationships exist between network structure and network performance that ought to be acknowledged?

According to the empirical analysis performed in this chapter, the questions can be answered in a positive way. The empirical material points to the conclusion that network structure does matter for the organizing capacities and the performances of the policy networks. Hence, a clear connection exists between the level of closure among a group of actors and the efficiency of collective action. Following this, an efficient network is a tightly connected set of actors. The empirical data also elucidate a positive relation between effectiveness and the level of network heterogeneity. An effective network contains a multitude of various actors involved in cross-boundary exchange processes.

Consequently, the tentative conclusion that can be drawn is that heterogeneity is a necessity for innovative policy networks to evolve and that the level of closure among the involved strongly affects the efficiency of their interaction. A highly performing network is a network in which the actors are tightly connected to each other and simultaneously have many connections to other actors engaged in other constellations.

Further, two new hypotheses specifying the relationship between structure and performance have emerged based on the generated findings. By relating network closure and heterogeneity to particular organizing functions (i.e., prioritization and resource mobilization), the propositions might serve as tentative explanations for why structure matters in the process of resource allocation within these networks.

First, it is proposed that the function of prioritization, so vital for the process of collective action to continue, is facilitated within dense and centrally integrated networks. The existence of many communication channels and commonly recognized coordinators fosters the establishment of a mutual understanding that facilitates the convergence of divergent goals and interests. It should, presumably, be easier to come to terms with what to do and how to do it within such constellations.

The second proposition asserts that the function of mobilization of resources is more facilitated within heterogeneous networks that span a large amount of global structural holes. A network with a homogeneous set of actors might have an advantage in the process of prioritization. Thus, when it comes to the mobilization of resources, heterogeneity seems to be the determining factor. Networks with a diversity of actors would have an advantage because of their likely access to a wider diversity of resources. The expected relationship between network structure and network performance can, thus, be modified and refined. The proposed relation is illustrated in Figure 6.7.

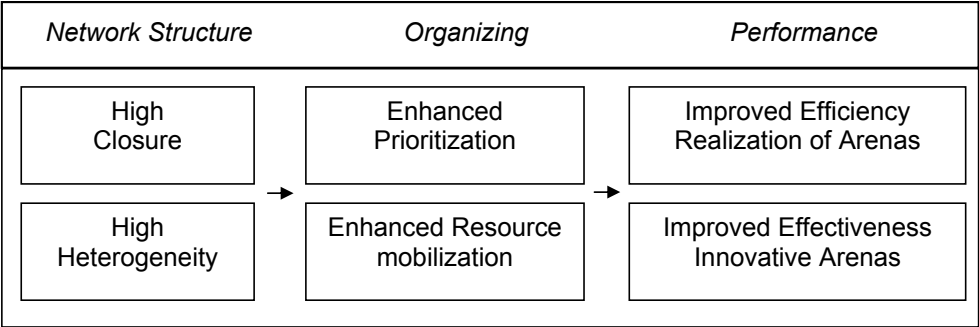


Figure 6.7. Network Structure, Organizing, and Performance in Case I

The generated knowledge about the qualities of efficient and effective policy networks might also be transferred and subject to testing in other societal processes and other policy contexts—or even on other analytical levels. In Chapter 7, these propositions will be further examined and tested on a higher inter-organizational level and in a different policy area. The next case study deals with networks struggling with inter-organizational collaboration in order to foster local economic development.

CHAPTER SEVEN

Case II: A policy network for local economic development

The shift from government to governance implies a new role for the state in the creation of public policy. The faith in central, general solutions in which the state has a dominant role is questioned. Instead, the mutual interplay between public as well as private actors, in different network constellations, is stressed. This is true for public administration in general and for regional policy in particular. Ideas about the ability to administrate local economic development from the top have been replaced by the image that development is a movement from the bottom. Public actors are perceived as facilitators, with a role of supporting and creating the necessary conditions for collaboration.

In light of the problems faced by peripheral and sparsely populated regions and the constant search for new tools to handle related challenges, the establishment of collaboration networks between universities, public administration, and economic life is emphasized. The basic idea relates to the principle behind the triple helix, implying that these kinds of constellations promote economic development (see, for example, Etzkowitz and Leydesdorff 2000; Etzkowitz 2005). The concept of the triple helix is compatible with contemporary ideas about regional policy as well as research policy. An ongoing discussion addresses the societal responsibility of the universities and their interaction with the surrounding society. This is emphasized by national law as the universities' "third assignment," apart from education and research (Högskolelag 1992, 1434, 1 chap. 2§). Furthermore, problem-based research is stressed, contrasting the more traditional view on science (Gibbons et al. 1994). This line of reasoning has made a real entrance into the sector of formal policy making, where scientific activities and problem-based research in network constellations uniting different sectors of society are proposed as determining components for economic growth.

This chapter examines a policy process in order to form such innovative institutional arrangements.

7.1 East Norrbotten Research Station

The empirical setting of this chapter is an areas north of Sweden in the region of East Norrbotten³³. The region contains four municipalities, from the coast to the inland parts of the country. Despite variations, the area is considered to be relatively economically poor, struggling with high unemployment rates and a declining population. The region is therefore the target of both nationally and EU-financed regional policy programs. In this context, the idea for a regionally based Research Station was introduced. Since the region lacks institutions for higher education and research, and given the influential attention research activities received in the prevailing ideas about local economic development, the political authorities of the four municipalities agreed to start such a Research Station based in the geographical area. The station would incorporate a School of Research and manage various research projects, all uniting the scientific knowledge with the needs and interests of local entrepreneurs (Carlsson, Lundgren, and Sandström 2003; FÖN Forskarskolan Östra Norrbotten 2007; Högskoleförbundet Östra Norrbotten 2007; Sandström 2004a; Ylinenpää and Strömbäck 2003; 2005).

The philosophy underlying the Research Station is in perfect agreement with the concept of the triple helix, implying that cooperation and coordination between the academic, political, and economic sectors benefit economic growth and social development. The overall purpose of the Research Station is to strengthen the competitiveness of the region and foster dynamic economic development. The creation of triple helix networks was proposed as a tool, yet the policy theory revealed an optimistic view regarding the possibility to create and steer networking activities. The aim, from the top, was to create structures from the bottom. In this chapter, the related policy process will be presented as an illustrative case of a problem-solving network in which the solution and the innovation are thought to be dependent upon the creation of win-win situations among a multitude of actors,

³³ Forskarstation Östra Norrbotten (FÖN).

specifically politicians, academics, and local entrepreneurs. The investigation of how network structure affects the performance of policy networks is thus continued in this chapter.

7.2 Aim

This case study is concerned with a program aimed at establishing a Research Station and related School of Research in the region of East Norrbotten. The process associated with this task, and the policy network that is formed as a result of these activities, constitutes the empirical unit of analysis. Drawing upon the findings in Case I, the hypotheses regarding the character of the relationship between network structure and performance are tested and, presumably, further developed in this chapter.

First, the policy network is scrutinized according to its network properties and its level of efficiency and effectiveness. Thereafter, the relation between the variables are examined and compared to what was found in Case I.

1. Does the empirical analysis support the assumption that network closure and network heterogeneity promote efficiency and effectiveness, respectively?
2. Does the empirical analysis support the assumption that, although network closure facilitates the process of prioritization, heterogeneity enables the function of resource mobilization?

The characteristics of the case, referring to the program objectives, its multi-actor structure, and inter-organizational setting, provide a good opportunity to further improve and develop the theoretical reasoning started in previous chapter. The current case allows for the testing of the preliminary findings in a different contextual setting and at a higher inter-organizational level. Thus, the process represents a suitable case for the general aim of this thesis.

7.3 Case Study Design

The working process and related policy network associated with East Norrbotten Research Station constitute the analytical unit. The study covers the process from when the idea was initiated in 1999 until 2005. It is a single case study design aimed at testing the findings of the previous chapter. The research design and the empirical measures applied are presented in Figure 7.1.

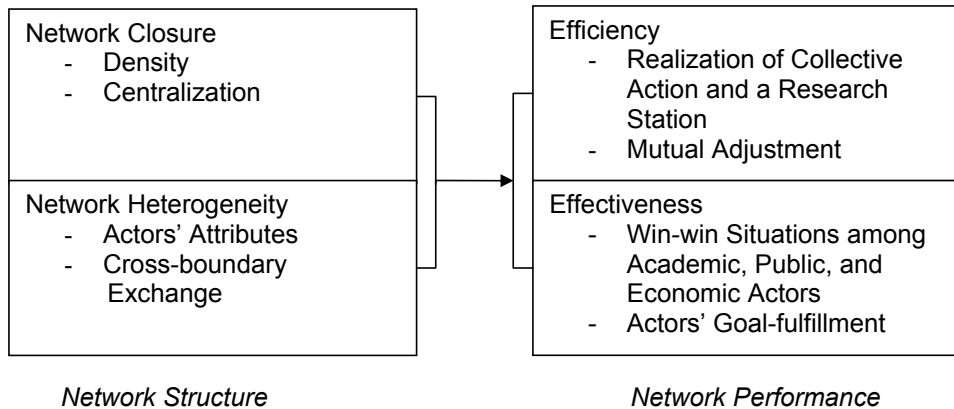


Figure 7.1. Case Study Design

The left side of Figure 7.1 presents the independent variable. Network closure and network heterogeneity are the main theoretical concepts; the application of these reflects the way in which they were used in Chapter 6. Closure will be investigated mainly using the SNA measures of density and centralization. The diversity of actors and the extent of cross-boundary interactions will be studied in order to determine the level of network heterogeneity.

Although compatible with the general notions of efficiency and effectiveness adopted in Chapter 5, the dependent variable is somewhat differently operationalized in this case study compared to the previous one (see Figure 7.1). The bargaining nature of the policy process and its complexity of goals are more acknowledged when determining the performance of this policy network.

It has been stated that, although efficiency refers to the achievement of collective action, effectiveness points to the level of goal fulfillment (see Chapter 5). The overall program goal of the Research Station was, in the long run, to promote economic growth and, in the short run, to create a setting in which regionally based knowledge production generates win-win situations among academic, public, and economic actors. Actors from the academic, public, or economic sector are presumably driven by contrasting logic and divergent purposes. The policy process of this chapter represents an attempt to reconcile these differences and create organizing structures beneficial for all. An effective network is a network that has managed this task (i.e., a network in which all types of actors share a perception of goal fulfillment).

Accordingly, the actors' views of the working process and its result must be studied. In order to recognize the interactive character of the process and its bargaining features, the focus is not foremost on the fulfillment of the initial goals governing the actors in the beginning of the process, but on the perceived goal fulfillment at the point of evaluation. The valuation regarding performance will be based on the "*a posteriori* goals developed during the game and inspired by the *a priori* goals which started the game" (Klijn and Teisman 1997, 118)³⁴. These authors apply the concept of joint interest defined as "the contribution the policy result makes towards the targets players aspire to at the moment the result is reached" (Klijn and Teisman 1997, 117-118). Have the policy process and the Research Station contributed to the aspirations held by relevant actors?

Estimating performance or effectiveness in accordance with actors' goal fulfillment is not unproblematic. Kickert et al. (1997) stress the danger of *ex post* rationalizing, the difficulty of demarcation, and the problem of aggregation. The two latter issues are of foremost relevance here. The issue of demarcation concerns who to ask and whose opinions to consider. In this case, the actors involved in the policy process represent the relevant population. The potential actors—those who could, but chose not to

³⁴ For an interesting discussion about evaluation of network processes, see Klijn and Teisman (1997) and Kickert et al. (1997). The authors suggest a set of concepts appropriate for the task of evaluating network effectiveness; only a part of their reasoning is discussed here.

participate—would indeed be an interesting group to study if the purpose of this chapter were to evaluate the project as such. However, for the sake of answering the research questions of this thesis, the chosen demarcation fulfils its purpose. The other issue concerns the aggregation of opinions. In this case, it is relevant to learn how the representatives from the divergent sectors of society experience the process and its results. The analysis is therefore focused on finding a general statement within each group of actors. Accordingly, network effectiveness will be determined by the level of goal fulfillment experienced by the academic, public, and economic actors.

Kicker et al. (1997) suggest that the evaluation of network effectiveness using the concept of joint action actually integrate the notion of efficiency as the actors will take the interaction costs into consideration when making their judgments. However, in this case, the notions of effectiveness and efficiency will be treated separately so as to ensure the agreement with the definitions adopted in Chapter 5 and the possibility of a comprehensive analysis of the different case studies. Following this, efficiency or the ability to achieve collective action will be determined by whether a Research Station is established or not. Furthermore, the existence of mutual adjustment (i.e., actors modifying their purposes and goals in relation to one another) will be studied to learn about this aspect (see Figure 7.1). An efficient network is a network that produces results and in which the actors learn and modify their actions to the actions of others.

7.3.1 Data Collection

Similar to the first case, the empirical analysis is based on both quantitative and qualitative data as well as documental records, surveys, interviews, and observational participation at various meetings. The data collection period spans from 2002 until 2005 in association to an evaluation group that had been assigned to follow, evaluate, and give feedback on the activities.

In this case, 42 formal interviews were performed; 12 of the respondents were academics, 11 were involved in commercial activities, and the remaining 19 were political or public administrative actors. Many more actors were initially contacted; however, as these persons stressed not being involved in the process or even being

unaware of its existence, no appointment for a formal interview was made. This was particularly true for the commercial actors. Initial contact was made via telephone or e-mail; the interviews lasted between 30 and 120 minutes. Most of the interviews were recorded. A majority of the respondents were met in face-to-face situations; however, telephone interviews were also carried out. Given the large distances and the fact that many actors had only taken part in certain activities, this line of action was suitable. The issue of confidentiality was discussed with all respondents. The interviews were structured around themes consistent with the organizing functions of the policy process (Appendix D).

The interview data were collected at different time periods. Some actors, for example the doctoral students and their supervisors, were interviewed at the beginning of the project, the public representatives in the middle, and the local entrepreneurs toward the end. However, since the two former groups were well represented at the later evaluation summits, expressing their views, this limitation was successfully overcome. Through the interviews, information regarding the organizing process and the participating actors was gained.

Based on the snowballing interviews and documental readings, a list of a total 116 actors was put together. The list contained both the names of the persons found in the documents, as members of certain groups or committees, and the names mentioned during the interviews. The list was sent out, asking the respondents (i.e., the persons on the list) to indicate the persons with whom they had discussed activities related to FÖN [East Norrbotten Research Station]. They were also asked to mark the square that best describes the frequency of the discussions, choosing between “occasional” and “several” discussions (see Appendix E). Thus, only the links reflecting the more frequent communication support the forthcoming social network analysis, a choice that has been discussed in previous chapters.

Given the findings of Chapter 6, indicating that certain organizing functions could be related to certain network structures, it would indeed have been interesting to generate SNA data on the policy network during different stages in the processes. However, as the network was large and spanned a wide range of activities over a

longer period of time, this idea was not implemented because of the risk that the questionnaire would be too long and complex to answer, jeopardizing the response rate.

A total of 102 persons answered the survey, resulting in a response rate of 88 percent. The missing data analysis shows that most of the non-responding actors have only marginal positions in the network (acknowledging the fact that this interpretation would perhaps be altered somewhat if answers from those persons would have been gained). The robustness of both the interview data as well as the SNA data of this chapter is therefore considered satisfactory. The relational data were imported into UCINET6, creating a DL file using the edgelist1 format. The analyses were run in UCINET6, while some of the calculations regarding actor attributes and cross-boundary interactions were done in a database created in Microsoft Access.

7.4 Network Performance

In this section, the policy process is described and its level of performance determined. Is the process related to East Norrbotten Research Station to be regarded as efficient? What about the level of effectiveness—has the process fulfilled the overall goal of creating a context of win-win situations among the actors?

The first ideas for a Research Station were brought up by political representatives in the region in 1999. At that time, the municipalities already had an ongoing cooperation regarding higher education matters through an inter-governmental body: the East Norrbotten Board of Higher Education³⁵. The main task of this body was to coordinate and promote decentralized education programs and academic courses within the region. The idea to expand the area of collaboration to involve scientific research as well stemmed from the need to counteract negative economic development. Inspired by the general ideas regarding local economic development, at that time strongly affected by the perception that research and higher education were the answer to the problems faced, and with the point of departure in an existing model of regionally based knowledge production previously implemented in the

³⁵ Högskoleförbundet Östra Norrbotten (HÖN)

region of Bergslagen, the work to develop the Research Station was initiated³⁶. As expressed by one of the initiators: “The Research Station has purposes on different levels; however, the general goal is to turn the negative trend around.”

The operational work started when a project leader was appointed to manage and coordinate the activities and establish the initial contacts, including the mobilizing of resources. LTU was contacted and asked to participate, a request that met with a positive response. The encouraging response from the university legitimized the idea, encouraging the initiators that the idea was feasible: “The support from the university was absolutely decisive.” A group of representatives from the university and the region formed and took on the assignment of leading the preparatory work. From that stage of the process, different work group constellations were formed and transformed, supporting the work of the project management.

The main part of the financial resources was mobilized through contacts with persons at different levels within the County Administrative Board (CAB) and other publicly funded organizations. The Research School qualified for Structural Funds from the European Union. Two universities became involved—namely, LTU and the Swedish University of Agriculture Science (SLU)—and provided the necessary scientific expertise.

Thus, most of the work regarding deciding what to do and how was performed within different working groups. As the aim of the project was to achieve a bottom-up process, the question concerning what research areas to be included in the School of Research was sent out to the municipalities to answer with the explicit goal to involve certain key actors, such as local entrepreneurs, in this process of prioritizing.

However, the final decisions concerning on which research areas to concentrate were carried out by the political representatives on the East Norrbotten Board of Higher Education. The priorities were established based on the perceived need by the local entrepreneurs, the existing knowledge within the universities, and the prospect of

³⁶ For more information about Bergslagen Research Centre, see von Otter (2001) and Svensson and von Otter (2002).

getting financial resources from the EU. Four research areas were chosen: tourism, wood design, blueberry cultivation, and perch breeding.

From January 2002 to November 2003, six Ph.D. students were appointed to the School of Research. Different working processes followed within each of these scientific projects. The doctoral students specified their areas of research and designed their projects together with their supervisors. The goal to involve local entrepreneurs in these tasks was clearly set. The doctoral students were also supposed to spend 20 percent of their time working for, and within, the region. Through summits, seminars, and personal meetings, contacts between the doctoral students, their research projects, and the local community were established. However, the actual involvement by the regional actors and their influence on the research process varied among the projects.

The Research School was continually evaluated. An evaluation group formed at the initial stage of the project followed the progress and provided feedback and support. A few larger evaluation summits were held, and a handful of evaluation reports were produced. By the end of 2005, the Research Station had given rise to a large number of different activities. Six research projects had started. In addition, activities such as seminars, courses, workshops, and tours had been held in the region.

The project has enjoyed a lot of interest from other institutions and from local and national media. Central commissions have mentioned the Research Station as a good example of local development work (Se Landsbygden! [...] 2006; Verkligheten som Kraftkälla [...] 2006). The process might also be characterized as innovative since it aims to create something new in regards to both the process and its expected results. The process was based on a certain knowledge base; its aim was seminal³⁷ and highly complex because of its cross-sectional nature. With reference to the previous discussion it could be asked: Is this process efficient and effective; if so, in what sense and to what extent?

³⁷ In addition to the Bergslagen Research Centre, a similar concept exists in Seinajoki in the north of Finland.

7.4.1 The Efficiency and Effectiveness of the Policy Process

Efficiency addresses the quality of the internal interactions within the network, the ability to achieve collective action, and the existence of mutual adjustment among the actors—a task that is far from unproblematic. According to one respondent: “the actors represent different worlds, and with that come a certain extent of suspiciousness. The entrepreneurs are to work with the municipalities, the municipalities are to collaborate with each other, and then, there is the university.” In this case, the organizing activities did result in the establishment of a Research Station. The process of problem definition, prioritization, mobilization of resources, and evaluation were carried out and successfully coordinated. A common problem and a shared idea about what to do and how were achieved through negotiations within the network. Altogether, this indicates that the process is a reflection of an efficient policy network.

However, the fact that the Research Station was established and collective action achieved does not say anything about the overall goal fulfillment of the program. The innovative purpose of the program—to foster regionally based knowledge production—actually incorporates the condition that the win-win situations discussed earlier are created among three certain type of actors—namely, politicians, academics, and economic entrepreneurs. Have win-win situations been created among the three actors of the triple helix? To answer this question, the actors’ perceptions of the working process and its result must be considered.

7.4.2 The Public Actors

The interview study reveals that the public actors³⁸ are generally satisfied with the policy process and its result: the establishment of the Research Station. The political representatives express an unquestionable belief in the casual relationship between higher education, research, and economic growth: “If we want to be successful in turning the negative trend, and foster economic growth, we have to integrate research and education into the region.”

³⁸ Elected politicians, public administrators, and representatives from non-commercial organizations constitute the group called public actors.

Significant for this group of actors is that the far-reaching goals, foremost expressed by the politicians in the beginning of the process, have been modified as a result of the interactions with the other sectors' representatives. Initially, high expectations were set regarding what kind of results the scientific projects of the School of Research would produce: "If these research projects will turn out the way we expect them to, they will have a significant importance. If the results will show how we can develop the industries." It was generally assumed that the generated findings from the Ph.D. projects would be directly applicable and thereby enhance the economic development in the region. They expected a strong connection to emerge between the scientific projects and the region; moreover, the projects were expected to provide solutions to certain problems experienced by local entrepreneurs while doctoral students would spend a significant part of their time working in the region. These expectations were adjusted as the process continued and as the public actors learned more about the logics steering the universities in general and the conditions restricting post-graduate education in particular. "I have learnt that there is a difference between how universities conduct research and our, perhaps, naïve, ideas about this project being the solution to our problems. In the beginning I thought a Ph.D. project could contribute in a more direct way, being more applied."

Thus, disregarding the fact that the initial aim proposed by many of the public actors was not fully fulfilled and their claim that greater involvement by the region would have been wanted, the general view is that the work is heading in the right direction. The working process did also result in unexpected gains, such as improved cooperation among the involved municipalities and between the municipalities and the universities. Although the utility for the region has not yet been proven, the public actors are satisfied as processes for collaboration have been initiated. They are convinced that the results will eventually come: "Yes, this is a good way of supporting the economic life of the region. However, it takes more than four years." Thus, the goals of the public actors have been fulfilled through the process of policy making.

7.4.3 The Academic Actors

The academic representatives³⁹ are also positive in regards to the policy process and its results. The establishment of the Research Station has satisfactorily fulfilled their goals. Problematic issues, foremost associated with the difficulty of linking the research activities to the needs and wants expressed by the regional actors, were solved as the work progressed.

In the beginning of the process, many academic actors claimed that the expectations proposed by the region were far too high and that the Ph.D. students lacked any real possibility to live up to them: “[The regional actors] think that we are coming with a magic box.” Another respondent said, “There is a line between the academy and industry. The entrepreneurs want to have help with market analysis, advice on tax issues, and help doing investigation work. That is hard for a doctoral student to provide.” A conflict emerged between the expectations of the region, searching for fast answers to difficult and basically practical problems, and the framework structuring the academic work, looking for generalized knowledge by applying scientific methodologies. Reference groups involving representatives from the economic sector, meetings, seminars and other activities were therefore introduced by the university actors in order to enhance the connection to and satisfy some of the needs expressed by the local entrepreneurs. “There have been problems, but I think that we have found solutions, compromises.”

Even so, the academic actors claim to be satisfied with the overall results. Everyone is essentially optimistic and supports the basic idea underpinning the Research Station. From the universities’ point of view, the involvement brought financial resources into the system, sponsoring the post-graduate education for several students. The project also offered the opportunity to put practice behind the rhetoric talk about the importance of “the third assignment,”—namely, cultivating the relations with the surrounding society. “The concept is working well; it makes possible the realization of the third assignment.” Consequently, the academic actors are generally satisfied with the policy process. “Seen from my perspective, the

³⁹ The group of academic actors consists of Ph.D. students, their supervisors, senior lecturers, and administrative staff involved in the Research Station.

orientation towards the surrounding society is nothing new. It is a part of our job.” The requests from the region have been met by arranging activities on the side of the specific scientific projects.

7.4.4 The Economic Actors

The impression regarding the goal fulfillment perceived by the economic sector representatives⁴⁰ is not as easily generalized as the viewpoints expressed by the other two sectors. Basically, one group of entrepreneurs is satisfied with the process and its result and perceives the process as a win-situation; the other one is not⁴¹.

The group of entrepreneurs sharing a positive attitude of the project has gained knowledge and input through their involvement in the policy process. Two of the respondents claim that their participation has directly affected their commercial activity in a positive way: “I would never have taken the investment decisions I have, if it had not been for the Research Station.” Others discuss the process as being interesting and informative: “I have gained so much. We were supposed to give [the Ph.D. students] input and advice. However, my experience is that it was as much the other way around.” The newly established relations with the university have also changed some of the actors’ perceptions of the universities for the better. One entrepreneur who had previous negative experiences working with researchers became positively surprised, stating that “the university has changed a lot.”

In contrast to these experiences, other entrepreneurs are remarkably dissatisfied with both the working process and its results. These actors regard the lack of influence in the stages of problem definition and prioritizing as a serious drawback. “We were not allowed to participate in the formulation of research questions nor in designing the studies.” Since they were not able to steer the direction of the research projects, they claim that they have not been able to benefit from the results. Two actors actually describe the entrepreneurs’ role in the policy process as solely legitimizing the actions controlled by others. “We entrepreneurs often become ‘hostages’ in these

⁴⁰ The economic actors consist of representatives from commercial organizations within the region.

⁴¹ Approximately half of the interviewed entrepreneurs were positive towards the process; the other half was either uncertain or negative.

kinds of projects.” Another viewpoint was that the expected knowledge-flow from the academia to the practitioners did not occur as the doctoral students did not possess enough competence and experience to really contribute to the daily activities of running a business. “I have listened to the doctoral students, but frankly, what they have to say is quite basic. They do not have much to offer for someone that has been in the business for a long time.” Thus, the contacts with the School of Research were satisfactory to some of the entrepreneurs and disappointing to others.

Despite the negative comments, a common view that is shared by all respondents is that input from scientific research is needed; with some important modifications, that they think a regionally based Research Station is a positive contribution establishing this connection. “Research—of course we need it! Imagine if I would use the same methods today as I did in the 70s.” Another respondent indicated, “The Research Station could formalize the connections between the region and the universities.”

7.4.5 Conclusions Regarding Performance

Thus far, the actors’ perceptions regarding the policy process and its result have been presented. Based on this feedback, should the network associated with the Research Station be characterized as high performing or not, in what sense and to what extent?

Obviously, the process has resulted in win-win situations between the public, the academic, and—to some extent—the economic actors. The effectiveness of the network can, with some reservation, be perceived as satisfying. Most of the actors and actors representing all three sectors of society perceive the network as an arena for cooperation and development. The residuals are the group of entrepreneurs who were not able to fulfill their goals within the ongoing process. Thus, with this fact in mind, the effectiveness of the policy network is considered to be moderate.

The continuous process of mutual adjustment is reflected in the stories told by the actors during the interviews and the evaluation summits. Initially, the presence of divergent interests and different purposes was perceived as problematic. For example, the high expectations raised by the regional actors mismatched the intentions of the academic actors. However, most of these actors claim that the nature of collaboration

has been vitally improved as the process continued. The participants have modified their expectations and their goals over time and have adjusted their strategies to one another, enabling the realization of the Research Station. In addition, many actors claim that their knowledge and understanding of the other sectors have been vitally improved. As expressed by one leading politician, “Today, I can refer to and talk about the university in a much more positive manner. It has been a positive journey, to discover that there is a commitment [from the university] also towards the peripheral municipalities.” Accordingly, the efficiency of the network interactions is perceived as high. Based upon this knowledge describing the performance of the network, what could be expected by its structure?

7.4.6 Hypothesis Regarding the Network Structure

The policy network discussed in this chapter is essentially an illustration of an efficient and partly effective policy process. With reference to the theoretical framework guiding this thesis, these features should be reflected in the network properties.

It has been concluded that the level of efficiency is high, indicated by the fact that the Research School was successfully established. The bargaining and negotiating process resulted in mutual adjustment and collective action, and a common prioritizing process has been performed and coordinated. In agreement with this:

H1. The network has a high level of closure, characterized by many connections and with a centrally coordinating unit.

Regionally based knowledge production assumes a successful resource mobilization process in which money, knowledge, legitimacy, and good ideas are pooled. Based on the data, the network is partly effective, with a reservation for the lower satisfaction among the group of entrepreneurial actors, indicating that the overall goal has not been completely realized. This implies that the proper resources—for example, the knowledge concerning the commercial issues—might not have been available in the policy process. According to the proposed hypotheses, network

heterogeneity is a prerequisite for a successful resource mobilization. In agreement with this:

H2. The network is heterogenic; however, the deficit in the goal fulfillment is reflected in the network structure, presumably through the level of network heterogeneity.

7.5 Network Structure

What are the network qualities characterizing the policy network? The overall network structure is examined with the point of departure in the concepts of closure and heterogeneity. In addition, the characteristic of the network structure during different time phases, here associated with the different organizing functions, is described.

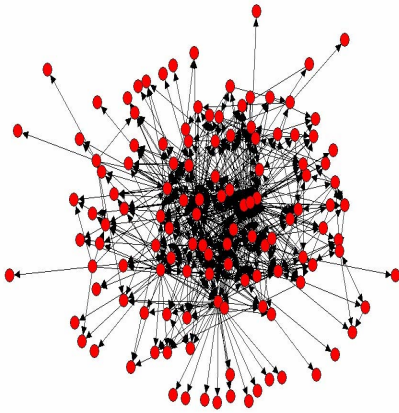
7.5.1 Network Closure

What can be said about the overall connectedness of policy network? Is the network centrally integrated, with a dense and hierarchical structure, or perhaps sparsely and fragmented in character? To answer this question, the size, density, and overall network centralization are analyzed. These data give important knowledge about the internal activity of the network, revealing its degree of network closure.

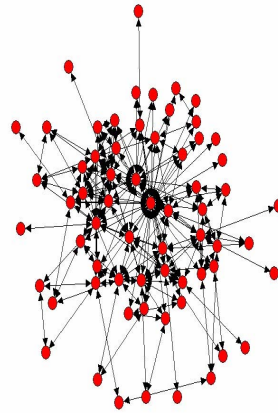
The policy network is studied by analyzing the structure using different tie strengths. In this way, two types of social networks are generated. In Figure 7.2, Network A represents the whole policy network; including ties that reflect relations of frequent interaction (see section 7.3.1)⁴². Network B consists of only the stronger connections, defined here as reciprocated ties⁴³. Based on these two datasets, the functions in UCINET6 are run.

⁴² Each relation was coded as 1. The data set is asymmetric and includes directed ties, which means that ties might or might not be reciprocated.

⁴³ In this data set, ties going in only one direction are excluded from analysis. The existence of a reciprocated link connecting two actors was coded as 1.



Network A – The Whole Policy Network



Network B – The Strong Policy Network

Figure 7.2. Visualizing the Policy Network

Network A consists of 125 actors connected by 828 links. Judging from the picture, the network is large and integrated; no visible subgroups can be detected. In Network B, showing only the reciprocated connections, the number of actors was reduced to 64⁴⁴. Still, the notion of a connected network remains.

The preliminary inference regarding the absence of fragmentation within the policy network is verified by the subgroup analysis run in UCINET6⁴⁵. Although the analysis reveals several subgroups, they are strongly interconnected. One apparent group is the actors connected to the project through their involvement in the evaluation process. Another group consists of administrative staff employed at LTU, yet another reveals a “tourism cluster” in which one Ph.D. student and four entrepreneurs are linked. The doctoral students and their supervisors together represent yet another group of actors more connected to one another than to the rest of the network. However, the largest subgroup is made up of the project leader, the administrators directly related to the Research Station, and several local politicians. In spite of the existence of all the above-mentioned subgroups, the network as a whole is considerably well connected thanks to the great overlaps between the

⁴⁴ When considering only mutual ties, two actors were disconnected from the main network and have been removed from the picture above.

⁴⁵ The subgroup analysis was conducted based on the strong and reciprocated network.

different constellations of actors. The largest subgroup mentioned above, connected through the project leader, is the core to which all other clusters are linked.

Network density (d) has been calculated for both types of networks. The whole policy network has a density of 0.05 d , while the stronger network is 0.10 d —modest figures, but considering the large size of the network, the network is regarded as connected. Another way to measure cohesion is to study the distance between each node in the network. The data show that the shortest path between all nodes in the network averages 2.3. This means that the average distance between each pair is approximately 2. Hence, the data support the conclusion that the network is connected.

To what extent are certain actors dominating the policy process? To answer this question, the overall degree centralization was analyzed, determining that it is high for both types of networks: 48 percent and 60 percent, respectively. The betweenness centrality is 21 percent for the whole network, and 58 percent for the stronger one. These figures, together with the degree centralization indices, indicate a hierarchical structure.

Centrality can also be studied at the individual level, revealing the centrality score of each individual actor. This procedure was performed using both aspects of centrality. Apparently, a few persons have been much more central than the rest since basically the same names are found among the 10 most central actors, regardless of the comprehension of centrality adopted.

7.5.1.1 Conclusions Regarding Network Closure

Table 7.1 summarizes the social network data regarding the level of network closure.

Table 7.1 Social Network Data on Closure

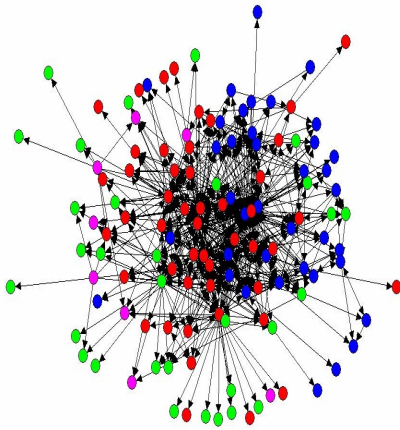
<i>SNA Measures</i>	<i>The Whole Policy Network</i>	<i>The Strong Policy Network</i>
Network Size (Nr.)	125	66
Average Distance (Nr.)	2.3	2.3
Density (d)	0.05	0.10
Degree Centralization ⁴⁶ (%)	48	60
Betweenness Centralization (%)	21	51

Based on the graphs in Figure 7.2 and the network measures presented in Table 7.1, the level of closure is interpreted. The working process of East Norrbotten Research Station has given rise to a large and, relative to its size, well-interconnected policy network. The network is not fragmented; it is neither constituted by distinct subgroups, nor thinly connected. On the contrary, substantial activity has been going on within the network, as indicated by the density levels; judging from the centralization indices, the network has a hierarchical structure. A core group of actors coordinating the activities demonstrates remarkably higher centrality levels. Accordingly, the level of network closure is perceived as significant.

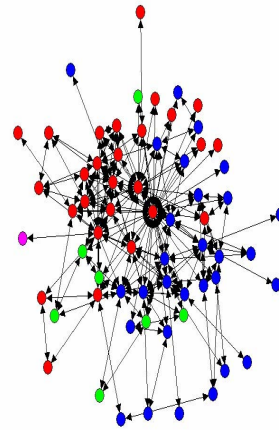
7.5.2 Network Heterogeneity

The actors of the triple helix represent three main categories: the academic, public, and economic sectors of society (see section 7.4). The important question is whether the policy network that has evolved in relation to the Research Station bridges the global structural holes between these sectors. This aspect is illustrated by the level of actor diversity and the level of cross-boundary exchange. What kinds of actors have been involved in the policy process and to what extent have these been involved in cross-boundary interactions?

⁴⁶ The decision was made to treat the data as symmetric.



Network A – The Whole Policy Network



Network B- The Strong Policy Network

Figure 7.3. Visualizing Network Heterogeneity

In Figure 7.3, the nodes of the networks are colored according to sector (red for public, blue for academic, and green for economic). At first glance, all sectors seem to be represented in the process of policy making, indicating significant network heterogeneity. Yet it appears as if the red and blue nodes dominate the inner circle of the network while the green node is situated in the periphery.

In Figure 7.4 the composition of actors in both types of networks is illustrated. Compared to an ideal model, in which all actors are equally represented, it is appropriate to state that the public sector dominates at the expense of the other two sectors, when regarding the whole policy network.

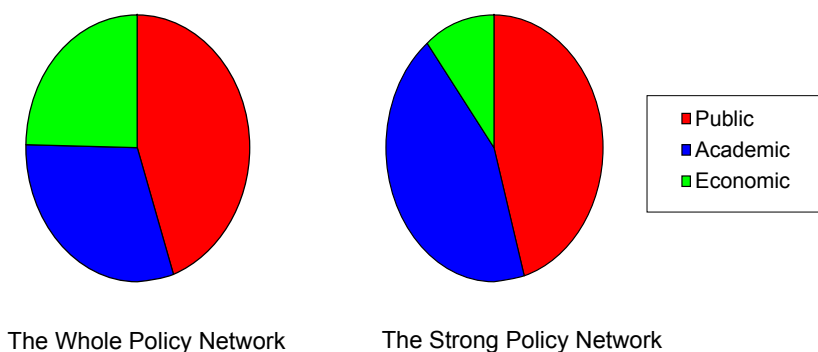


Figure 7.4. The Sector belongings of the Actors

However, considering the strong policy network of reciprocated ties, the proportion of actors is altered. Here, actors belonging to either the public or academic sector outnumber the economic actors.

To what extent are interactions taking place across different societal sectors? This question was examined by dividing the number of relations bridging sectors by the total number of relations in the network. The proportion of cross-boundary exchange was 39 percent for the whole policy network and 31 percent for the stronger structure. However, what patterns can be traced in this cross-boundary interaction?

Tables 7.2 and 7.3 show between what kinds of actors the communication has occurred. It is important to notice that it is the actual number, not the proportions, of ties from and to each sector that are presented in these tables.

The tables are read either by the rows, showing the links going from each sector, or by columns, showing the links going toward each sector. For example, from Table 7.2 it is possible to conclude that the economic actors have relations going toward 82 other actors and that most of these ties—specifically, 39 of them—are linkages to public actors. At the same time, the economic actors have been pointed out by 84 actors, 48 of whom are representatives from the public sphere.

Table 7.2. Cross-boundary Exchanges of the Whole Policy Network

	<i>Economic</i>	<i>Public</i>	<i>Academic</i>	<i>Total (Nr.)</i>
<i>Economic</i>	23	39	20	82
<i>Public</i>	48	329	139	516
<i>Academic</i>	13	65	152	230
<i>Total (Nr.)</i>	84	433	311	828

Table 7.3. Cross-boundary Interactions of the Strong Policy Network

	<i>Economic</i>	<i>Public</i>	<i>Academic</i>	<i>Total (Nr.)</i>
<i>Economic</i>	6	9	8	23
<i>Public</i>	9	168	43	220
<i>Academic</i>	8	43	92	143
<i>Total (Nr.)</i>	23	220	143	386

The presumption that the public sector representatives have been the most active in the policy process is clearly verified in Tables 7.2 and 7.3. Another conclusion is that, although significant cross-boundary interaction occurs among all three sectors, a considerable part is actually connecting actors of the same category. The low proportion of ties involving economic actors in the network activities suggests that the network is unbalanced.

A fully balanced triple helix collaboration would reveal a network in which the relations among the three involved sectors are equally strong. In such an ideal model, all three categories are in close contact with one another and are equally important as no category dominates the activities at the expense of the others. To what extent does the network in focus fit into this model?

Figure 7.5 provides a good description of the participation and exchange patterns in the policy network related to the Research Station. The picture on the left reflects the whole network, while the picture on the right presents the strong network. The sizes of the nodes reflect the representation of each sector. The thickness of the lines connecting these illustrates the strengths of the relations. It should be noted that only the cross-boundary exchange is visible in the figure. In other words, Figure 7.5 measures the triple helix collaboration.

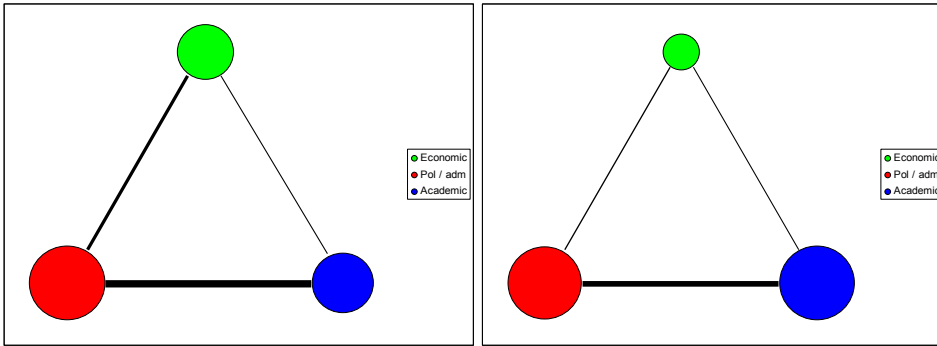


Figure 7.5. Measuring the Axes of the Triple Helix⁴⁷

Considering the whole policy network on the left, the public sector has been over-represented. The line connecting the red and blue nodes is clearly the thickest, indicating that cooperation has mainly occurred between the academic and political sectors while the interaction between the academic and economic sectors has been minor. This notion is further verified in the strong network on the left, where the minor involvement of the entrepreneurs is clearly visible.

7.5.2.1 Conclusions Regarding Network Heterogeneity

The social network analysis has been performed using different SNA measures; the data have been analyzed from various angles. The network is heterogeneous, containing all three relevant sectors of society. The data indicate that 31 to 39 percent of the exchange has taken place across the borders of these sectors.

However, Figure 7.5 indicates that the triple helix is unbalanced. The public sector is the largest group, followed by the academic and then the economic sector. The bridges that have been established foremost connect the academic and the public sectors. This picture is further verified in the qualitative data generated from the interviews. Accordingly, the network of the Research Station is heterogenic, but unbalanced.

⁴⁷ The figure was made in Excel, based on the social network data.

7.5.3 Different Networks Performed Different Organizing Functions

Due to the methodological choice to treat the policy process as one single process (see section 7.3.1), the structural data do not reflect the full complexity of the process. For example, it is not possible to reveal the network dynamics (i.e., how the network has evolved over time). However, the qualitative data gained from the many interviews, collected during different time periods, provide information on the social network that might complement such an analysis.

It is obvious that the characteristics of the social network have changed during the different phases in the policy process. The shape of the network has changed while performing the functions of problem definition, prioritization, resource mobilization, and evaluation.

As evident in Table 7.4, a smaller network of political actors performed the function of problem definition. The Research School was essentially perceived as a way to solve the economic problems faced by the region. In other words, the program was designed to solve issues experienced by the local politicians.

Table 7.4. Organizing Functions and Participating Actors

<i>Organizing Functions</i>	<i>Participating Actors</i>
Problem Definition	A small network of political actors involved in the inter-organizational government body of East Norrbotten
Prioritizing	An enlarged network of local political actors, academic actors from the participating universities, and some local entrepreneurs
Resource Mobilization	An enlarged network of political and academic actors, working with administrative actors from the regional level
Evaluation	A small network of public and academic actors

When the intense search for resources—both financial and immaterial—started, the network became enlarged. Here, public actors from local and regional authorities

formed a horizontally and vertically integrated network by working together with the administrators at the university in order to find the resources needed.

The process of early prioritization (i.e., deciding with which scientific research areas to work) was strongly dominated by the public and academic sectors. However, at this stage, many more public actors representing the municipalities at lower levels of organization took part. Also, a few local entrepreneurs became engaged in this process.

In a later phase of the project, after the doctoral students had started their work, the constitution of the network once again changed. The prioritization process continued within the six related research projects. Representatives from the academic sector dominated these activities, together with the administrative staff employed in the project. This latter group was responsible for various practical arrangements. However, at this stage, the entrepreneurs representing the economic sector made their real entrance into the process. Using network terms, one can say that this resulted in a better-balanced network. Still, the public and academic sectors dominated the process at the expense of the economic sector. The same is true for the evaluation function, in which the entrepreneurs did not participate.

Finally, the interviews support the view, also detected in the SNA analysis, that during the entire project phase, the policy network was comprised of a densely knit core in which the project management, together with key actors from the political and university sectors, linked and coordinated the various functions and activities. Thus far, the policy network has been studied using social network analysis. In the next and final section of this chapter, the issue about how structure relates to performance will be discussed.

7.6 Preliminary Conclusions

Does the analysis of the policy network related to East Norrbotten Research Station support the assumption that network closure and heterogeneity promote efficiency and effectiveness, respectively? Does the empirical analysis support the assumption

that, although network closure facilitates the process of prioritizing, heterogeneity enables the function of resource mobilization?

It has been demonstrated that Case II illustrates an efficient and partly effective policy network. Two hypotheses were formulated based on this information (see section 7.4.6). The topic of this concluding section is to examine whether these have been confirmed by the social network analysis.

H1. The network has a high level of closure, characterized by many connections and with a centrally coordinating unit.

H2. The network is heterogenic; however, the deficit in the goal fulfillment is reflected in the network structure, presumably through the level of network heterogeneity.

With reference to the high level of efficiency that has been demonstrated, the first hypothesis expresses the expectation of a well-connected network. This assumption is confirmed by the social network analysis. The degree of network closure is perceived as high, which has presumably facilitated the processes of prioritization and the ability to coordinate the divergent activities. The development of the Research Station has been achieved through a process in which actors, with divergent logics and sometimes conflicting goals, have met, adjusted, and compromised in order to achieve collective action.

The process has been classified as partly effective. The overall goal of the Research Station, to become an arena for regional knowledge production creating win-win situations among the actors involved, has not been fully realized. Accordingly, the second hypothesis suggests that the network structure would be moderately heterogenic. This assumption is further confirmed by the social network analysis. The network is heterogenic as it contains all three types of actors as well as a significant amount of cross-boundary interactions. However, at the same time, the unbalanced representation among the three actors supports the interpretation of a “too low” degree of heterogeneity. It is more appropriate to speak of an “unbalanced

heterogeneity.” The structural holes between the political and academic sector on the one hand and the commercial sector on the other have not been successfully bridged, which has probably lowered the ability to mobilize the proper resources needed—for example, the experience and knowledge from commercial activity—which in turn has negatively affected the level of goal fulfillment.

Thus, the empirical findings of this case study further support the theoretical ideas outlined in Chapter 4 and tested in Case I. In order to achieve both efficiency and effectiveness, a network has to be both heterogenic and well integrated. When the level of heterogeneity is lower, as exemplified in this case study, the level of goal fulfillment is reduced. Consequently, when effectiveness or innovativeness is thought to be dependent upon the creation of win-win situations across borders, the level of network heterogeneity is a determining variable of innovation.

Further, the proposed relations between network structure and the organizing functions, developed in Case I, are also confirmed. Although internal, or local, network integration promotes the process of prioritization; the level of heterogeneity seems to be correlated with the task of resource mobilization. The qualitative data describing the set of actors that participated in the performance of different functions in the process of policy making underscore the relevance ascribed to these ideas (see Table 7.4). The process of problem definition was, most likely, promoted by the fact that it was a small network of a set of homogenous actors who agreed on the essential ideas underpinning the Research Station. The struggle over priorities, concerning for example which areas to research and what lines of actions to take, indicated the foremost controversy between actors belonging to different sectors of society. The network became enlarged as it experienced a need to mobilize new resources to effectuate the ideas, thereby confirming the theoretical notion of networks as creations of the needs for new instrumental resources to accomplish collective action (see Lin 2001 in Chapter 3). The function of evaluation was “ruled” by public and academic actors, lacking the input from the local entrepreneurs.

The information above emphasizes the interconnectedness of the different organizing functions in the process of policy making and how these affect and are affected by the

network structure, in agreement with the notion of a dialectical relationship between structure and performance (see Chapter 3). The constellation of actors in control of one function affect and reinforce the formation of the constellations in control of the others. Although the stages of problem definition and prioritization might be enhanced by a tightly connected homogeneous group of actors, this type of network structure might indeed complicate the subsequent task of mobilizing critical resources. For example, the network of local politicians had no trouble defining the problem or doing the early prioritizing; however, the lack of resources (i.e., knowledge about commercial activity) might be a consequence of the fact that the entrepreneurs did not have access to the initial phases of the policy process. Some of the entrepreneurs declined the offer to participate in the process as they thought the project as such was organized around the wrong kind of problems. Another example of the dialectical relationship between the organizing functions and network structure is that the lack of entrepreneurs in the process of evaluation is likely to have affected the lines of actions taken, which presumably negatively affected the overall goal fulfillment in the end. Accordingly, as effectiveness is dependent upon the existence of network heterogeneity, this feature is important in the performance of all functions in the policy process, regardless of the difficulties it brings, lowering the ability to advance quickly because of the existence of divergent purposes and interests.

The policy process related to the Research Station also illustrates the great potential and capabilities of network interactions. It has been demonstrated how a well-connected network fosters agreements and compromises among divergent actors. It has also been proven that actors can overcome contrasting logics and reconcile differences, foremost exemplified by the mutual adjustments that have taken place between the academic and public actors.

Hjern and Hull (1987) emphasize the importance of coordination for good implementation. The case study supports this assertion. The level of network closure, empirically implied by its connectivity, hierarchy, and a consistent core, is easily related to the proven ability to manage and coordinate the whole process successfully.

The tentative findings reported in this chapter are illustrated in Figure 7.6 which is a more complex version of Figure 6.7, which summarized the findings of Case I.

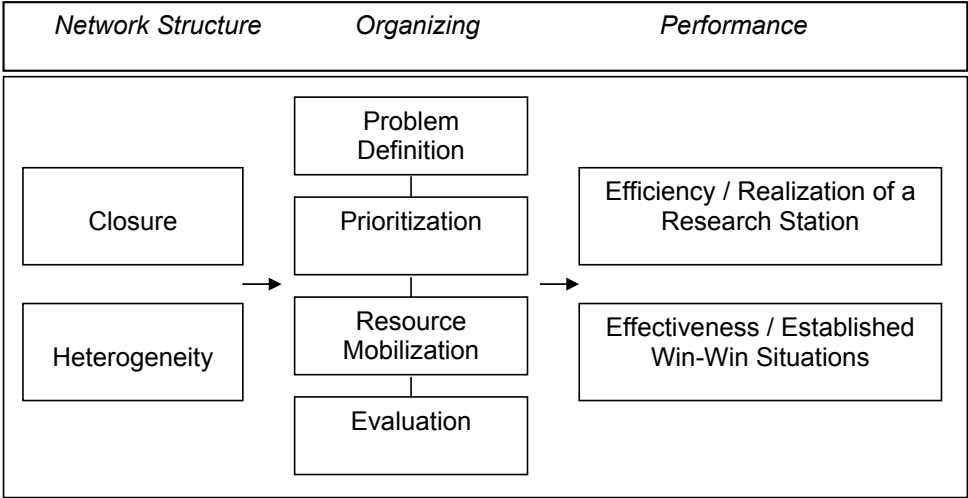


Figure 7.6. Network Structure, Organizing, and Performance in Case II

Accordingly, promoting effectiveness requires developing multi-actor structures in which private and public actors cooperate in order to pool resources and agree on joint priorities. This assumption will be the starting point of the next empirical chapter, in which a network for adaptive resource management is studied. Within the field of natural resource management, the innovative features of policy structures have been identified as being of vital importance. Top-down, centralized and state-dominated management structures have proven to be unsuccessful in achieving these desirable features and, consequently, the concept of co-management has been adopted to describe the kind of multi-actor structures assumed to possess the capacities to meet these requirements. The ideas of co-management essentially incorporate the same idea of merging relevant stakeholders in cooperative structures as the ideas underlying the knowledge areas studied in Case I and the concept of triple helix collaboration researched in Case II. In network terms, a long-term successful co-management system should, presumably, reveal a network with the qualities found to be important in the first two case studies. However, being only an assumption, its relevance must be objective for empirical investigation.

CHAPTER EIGHT

Case III: A policy network for adaptive resource management

Within the field of natural resource management (NRM), the search for innovative institutions is an ever-challenging task. The puzzle of how to govern the commons has engaged researchers as well as practitioners for many years and probably will for many more years to come.

Managing natural resources is basically about regulating the patterns of resource use and transforming the state of the resource to the better (Ostrom and Schlager 1996). Thus, it is a policy process in which institutions are being formed and transformed, affecting how the resource is allocated. The primary dilemma of NRM concerns the issue of overuse and degradation of the resources. These complexities spring from the “collective action” problem (i.e., a mismatch between the individual rationality and collective rationality), as illustrated in Hardin’s scenario of “the tragedy of the commons” (Hardin 1968; Olson 1965). This intrinsically institutional barrier and the essential nature of a common experience as characterized by the difficulty of excluding potential users and the fact that one user’s withdrawal affects the resource stock available to others significantly complicate the task of finding proper arrangements for a sustainable resource management (Ostrom 2005).

However, research has progressed; the scenario of an inevitable tragedy facing the commons has been called into question. More is known about people’s capacity to organize, build effective policy structures, and cope with the challenges (Dietz, Ostrom, and Stern 2003; Feeny et al. 1990; Ostrom 1999). Evidence suggests that top-down centralized systems are less suitable for this task (see, for example, Rova 2004). Although the governance framework implies that most societal problems are too complex to fit into the structures of formal policy making, it has been emphasized

that the cross-scale nature of the policy problems are even more apparent within the area of NRM (Berkes 2002; 2007). They span time, geographic space, and certainly administrative jurisdictions.

In order to meet these challenges, the search for appropriate policy-making structures has resulted in the formulation of a variety of related concepts, such as adaptive management, local adaptive management, collaborate management, and co-management (Carlsson and Berkes 2005; Koontz and Thomas 2006; Olsson, Folke, and Berkes 2004; Plummer and FitzGibbon 2004; Plummer and Armitage 2007; Rova 2004; Rådelius 2002; Sabatier et al. 2005; Walters 1986; 1997; Zachrisson 2004). The underlying idea is that, in order to cope with the complexity of natural resource systems, institutional arrangements and related management systems should incorporate different actors from different sectors of society. Thus, an emphasis on the establishment of multi-actor networks, consisting of both public and private actors, is a common denominator of the concepts referred to above. Co-management, the concept applied here, is normally understood as a process in which actors cooperate and share power in order to solve problems related to resource use (Jentoft, McCay, and Wilson 1998). Carlsson and Berkes (2005) stress that these structures could best be described as network governance systems.

Another characteristic of the collaborative approach is the significance ascribed to the existence and generation of ecological knowledge, thereby supporting the policy process. The relevance of bridging and making use of different kinds of knowledge—namely, local ecological knowledge and scientific knowledge—has been stressed (Olson and Folke 2001; Sabatier, Weible, and Ficker 2005; Weeks 1995). In this chapter, the notion of adaptive co-management will be applied as the main theoretical concept addressing the issue of performance in resource management networks.

Adaptation has, together with terms like *resilience* and *robustness*, gained significant attention in the literature, basically addressing the quality of the link between resource management and the socio-ecological environment (Janssen, Anderies, and Ostrom 2007; Olson, Folke, and Berkes 2004; Smajgl and Larson 2006; Wennberg DiGasper 2006). Adaptive management involves actors who perceive the ecosystem

as complex, non-linear, and characterized by uncertainty (Folke et al. 2002). Drawing upon work done by Pinkerton (1989), Pomeroy (1995), and Hanna (1998), Folke et al. define adaptive co-management as “a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of trial-and-error” (2002, 20). This definition implies a policy process that is constantly adapting and adjusting to variations in the ecological system and in the institutional context in which the management is embedded.

Although the conceptual ideas referred to herein incorporate the assumption of the creation of social networks, the theory and tools provided by SNA have—save for a few exceptions (Crona and Bodin 2006; Frank et al. 2007; Maiolo and Johnson 1989; Maiolo, Johnson, and Griffith 1992; Johnson 1986)—not been commonly applied within this field. However, the adoption of a network approach studying these issues has been requested (Carlsson and Sandström 2008; Janssen et al. 2006). This chapter examines a co-management network governing ‘a common’ by applying the tentative findings of previous chapters to uncover how network structure impacts the performance of policy making.

8.1 A Fish Management Area

The common experience addressed in this chapter is the fish in the lakes and watercourses in a municipality situated in the county of Västerbotten in the northern and inland part of Sweden. The geographic area is large, with a radius of 130 kilometers, and includes approximately 40 larger lakes, 20 larger brooks and tributaries, and 40 kilometers of river. The area holds a diversity of fish species such as pike, perch, whitefish, grayling, and salmon trout (Lycksele Fiskevårdsområde 2007). The fishing activity of the area includes both angling and household use fishing.

In administrative terms, the area constitutes a Fish Management Area (FMA), which is a specific type of regime regulated by national law (Dhyre and Edlund 1982; Lagen 1981, 533 om Fiskevårdsområden). It is a property-based fisheries co-management system, mandating those holding fishing rights the authority to control the resource

system (Piriz 2005). The law stipulates the conditions under which FMA's can be established, how they should be organized, and their sphere of authority.

The general purpose of such organizations is to promote the common interests of the proprietors, making possible the coordination of activities affecting the waters and the resource stock. All actors with properties related to fishing rights within the specific area are incorporated in the FMA and as members of the association controlling it. The association is further regulated by its own charter, in which the aim of the FMA, its basic principles, and the relation between the association and its members are articulated. The work is governed by a board elected by the members. The rules stipulating the appropriation of the resource are settled either by the charter or at the member meetings. In cases of rule-breeching, the FMA has the right to impose sanctions. Appeals of decisions made within the FMA are preliminary directed to the County Administrative Board (Lag 1981:533 om Fiskevårdsområden).

Thus, FMAs have extensive rights in governing the resource. They have the management rights to regulate the patterns of use and exclusion rights regulating access⁴⁸. These rights have been identified as critical, affecting the users' ability to control the system as well as their incentives to invest time and effort in the process of policy making (Ostrom and Schlager 1996). In real-world settings, a wide spectrum of co-management arrangements exists, separated by the division of authority between government authorities and the community or resource users (Carlsson and Berkes 2005). Sen and Raakjaer Nielsen (1996) and Njaya (2007) discuss co-management by distinguishing between a set of categories according to the division of authority. In this respect, the FMAs are informative arrangements, meaning the community is given the most far-reaching authority to manage the resource. Thus, it should be emphasized that the establishment of FMAs in fact reflect a transfer of authority from the proprietors to the FMAs, which in turn are regulated by formal government. As mentioned before, it is a property-based co-management arrangement. Thus, this is the broad formal institutional context into which the policy process, constituting the empirical case of this chapter, is embedded.

⁴⁸ Compare with Ostrom's (2003) categorization of how different positions in an action situation correlate with different rights.

The great complexity of NRM structures, the inherent challenges in achieving collective action and institutional change, and the need for innovative solutions to cope with these, make this an appropriate case for a final examination regarding the relation between network structure and performance of policy networks.

8.2 Aim

This chapter examines a policy network that governs an FMA. The tentative findings from previous case studies will be related to the field of NRM, and hypotheses regarding how network structure presumably affects the performance of co-management networks are formulated and tested. In this case, performance is approached using the notion of adaptability, essentially comprising both the notions of efficiency and effectiveness. The following questions guide the analysis:

1. Does the empirical analysis support the assumption that network closure and network heterogeneity promote efficiency and effectiveness, respectively?
2. Does the empirical analysis support the idea that, while network closure foremost facilitates the process of prioritizing, heterogeneity enables the function of resource mobilization?
3. Does the empirical analysis support the notion that a dialectical relationship exists between the organizing functions and the qualities of the networks performing these functions, essentially implying that both structural qualities are necessary for high performing policy networks?

8.3 Case Study Design

This study is designed as a single case study in which the policy process and related policy network governing the FMA constitute the analytical unit.

8.3.1 Hypotheses regarding Adaptive Policy Making

Network performance will be approached by adopting the concept of adaptability. An adaptive policy process is sensible to the ecosystem, perceiving its full complexity, and holds the capacity, ambition, and power to act accordingly. Thus, rules are continuously reconsidered and adjusted for the complex and ever-changing environment, as illustrated in Figure 8.1.

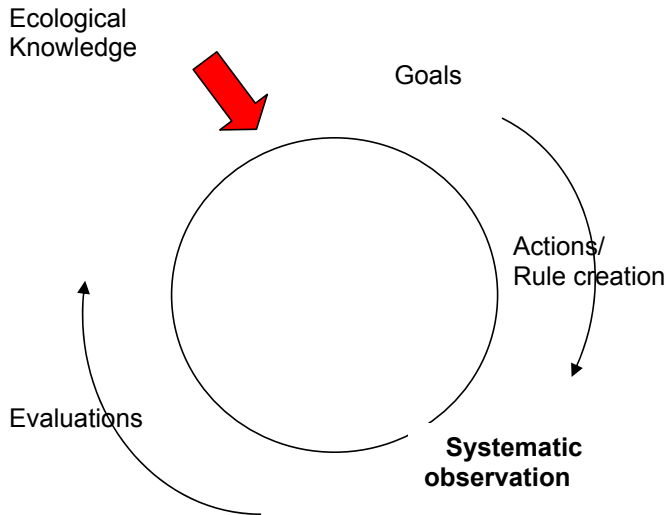


Figure 8.1. Adaptive Resource Management (adopted from Carlsson 2006)

Adaptive management is a continuing process of trial and error. Thus, active rule-forming processes based on available ecological knowledge, local as well as scientific, are determining prerequisites of adaptive policy networks.

This notion of adaptability is hereby related to the apprehensions of network performance presented in Chapter 5 and applied in Cases I and II. Although efficiency refers to the ability to achieve collective action, formulating rules structuring the appropriation of the resource, effectiveness is thought to reflect the quality of the rules according to changes in the ecological system. Therefore, in line with the theoretical framework and the findings of previous case studies, it is hypothesized that the performance of co-management networks will be affected by certain network properties, particularly network closure and heterogeneity.

Network heterogeneity has, thus far in this thesis, been related to the function of resource mobilization. In the literature on NRM, enhanced resource exchanges are stressed as a key argument for creating co-management systems (Carlsson and Berkes 2005). Other gains ascribed to co-management might also be related to network heterogeneity. For example, a diversified network is probably better equipped because of the enriched possibility to divide labor, enhancing specialization and risk sharing (Carlsson and Sandström 2008). However, in this chapter, the relationship among heterogeneity, effectiveness, and resource mobilization, treating ecological knowledge as the main resource, will be the primary aspect of analysis.

Thus far in this thesis, network closure has been regarded as a prerequisite for the achievement of collective action and the function of prioritization. Within the branch of NRM, collective action is a desirable quality that reflects the capacity of establishing, upholding, and maintaining the rules of the game. Network closure might also be related to other, closely associated concepts, frequently appearing in the literature of co-management. For example, closed networks are believed to lower transaction costs and enhance the ability to handle and solve conflicts (Carlsson and Sandström 2008). Thus, in this chapter, the notion of collective action, efficiency, and prioritization as well as its relation to network closure will be explicitly tested. As such, the following hypotheses are formulated.

H1. Network closure promotes the process of problem definition and prioritization, conditions that are necessary for collective action. In other words, this feature can be related to the efficiency of the rule-forming process within the policy network.

H2. Network heterogeneity promotes the process of resource mobilization—in this case, knowledge about the ecological system. This, in turn, fosters the existence and spread of ecological knowledge among the users, which is a prerequisite for an effective rule-forming process based on prevailing knowledge about the ecosystem and changes within this system.

Accordingly, if network performance is defined as the adaptability of policy networks, governing natural resources, both network qualities presumably matter. The hypotheses suggest that, although network heterogeneity facilitates the access to a diversified set of resources (i.e., different kinds of knowledge about the conditions of the ecosystem), network closure is likely to improve the ability to set rules and maintain and monitor them.

8.3.2 Design and Empirical Measures

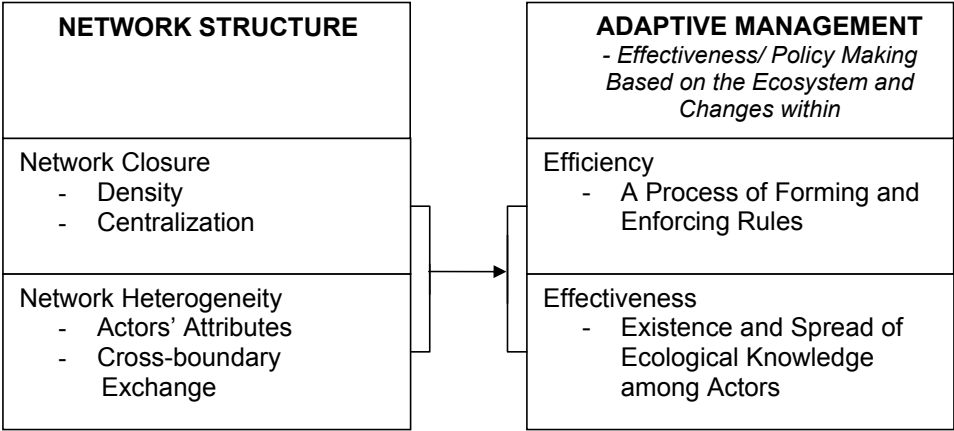


Figure 8.2. The Case Study Design

The research design, and the variables applied, is presented in Figure 8.2. The left side of the figure presents the independent variables. Since the conceptualizations of these and the use of the SNA measures are basically the same as those of previous chapters they will not be recapitulated here.

NRM concerns the policy process in which goals and rules structuring the appropriation of the resource are formulated, implemented, and evaluated. The concept of rules was defined in Chapter 3 as “prescriptions that humans use to organize all forms of repetitive and structured interactions” (Ostrom 2005, 3). Thus, they are according to Ostrom’s terminology “rules-in-use,” not necessarily formal or written rules. These rules regulate the relation between the users and the resource as

well as the relation among users and give rise to ecological footprints. In every setting, the level of complexity is immense, and the institutional analysis can be conducted on different levels (Ostrom 2005). In this case study, the rule-forming process at the operational level directly affecting the pattern of appropriation will be the objective for analysis, including the boundary rules, the choice rules, the scope rules, and position rules (Kiser and Ostrom 1982; Ostrom 2005).

One basic assumption of this chapter is that adaptability determines our understanding of performance. With reference to the adopted comprehension of this concept (see Figure 8.2), the performance of the policy network is determined by studying how well the following requirements are fulfilled:

1. Do rules exist to regulate issues like who can use the resource and under what conditions? Are these rules “known and used” (i.e., are they accepted and followed)?
2. Do actors involved in the policy process consider the resource system to be complex, non-linear, and characterized by significant uncertainty? Does the policy process comprise elements of observations, experiments, and learning?
3. Does a clear connection exist between users’ comprehensions concerning the conditions of the ecosystem and its internal changes as well as the rule-forming process?

If the policy-making process corresponds positively to these questions, the network is characterized by a high level of adaptability, being both efficient and effective.

8.3.3 Data Collection

The study was conducted in the autumn of 2006. The data collection procedure followed those used in the previous two case studies. After a document and literature study, data were collected through interviews and a questionnaire that contained sociometric questions. In addition, interviews provided qualitative information about the process of policy making. Twelve interviews were carried out, sampled by a

snowballing technique (see Appendix F)⁴⁹, starting with the chairman of the FMA board. The interview sessions lasted from 30 to 120 minutes. A tape recorder was used during most interviews, and the material was transcribed for analysis. The issue of confidentiality was discussed with all respondents.

The survey (see Appendix G) was sent out to 48 persons, including those who had been mentioned during the interviews and a few listed as contacts for the board of the FMA. The rule-forming network was mapped, asking the respondents the following question: “Who do you usually talk to about the *goals*, *rules*, and *routines* of the Fish Management Area?”

To refine the data and explore the possible benefits of collecting data about different types of relations within a policy network associated with different organizing functions of the process (suggested in Case II), an additional type of communication link was mapped. Hence, each respondent was also asked “Who do you usually talk to about the *ecological status* (i.e., the physical condition of the fish and waters of the FMA)?” This question was asked in order to reveal the “network of ecological knowledge” that, as already mentioned, is assigned great importance in the literature. This also enabled a comparison of differences and similarities of the two types of networks.

Of the total 48 sent out, 43 questionnaires were returned. Two of these were not filled in. It is not known whether these blank questionnaires should be interpreted as completed, reflecting the non-existence of ties, or whether they have been returned blank due to some other reason. If the former is true, the response rate is 90 percent; otherwise, it is 85 percent.

The data were imported into UCINET6 creating a DL file using the linked list format, nodelist1. The two types of relational data (i.e., the rule-forming network and the ecological knowledge network) were coded as separate data files. The visualizations of the networks were created in Netdraw (Borgatti 2002); some of the calculations were performed in Microsoft Access.

⁴⁹ Two interviews were done over phone, the others in face-to-face situations.

8.4 Network Performance

In this section, the performance of the FMA policy process is presented. Prevailing rules affect the users and their interactions with each other as well as the resource system. Therefore, the process of rule formation and its connection to prevailing ecological knowledge are studied to determine in what aspects the policy process can be regarded as being adaptive.

8.4.1 Rules Governing the FMA

Do rules exist regulating issues like who can use the resource? Under what specific conditions can the resource be appropriated? Are the rules “known and used” (i.e., are they accepted and followed)?

The operational rules governing the appropriation of the resource are formally controlled by the FMA. The property-holding actors with fishing rights have transferred their rights to the FMA, mandating the organization with the authority to establish rules and routines for how to use and manage the system. Most of these written-down rules were developed a long time ago in connection to the establishment of the FMA in order to increase the credibility of the managerial capabilities when the association applied for project foundation from the County Administrative Board.

Boundary rules determine who is entitled to utilize the resource (i.e., to fish within the geographical area). In the studied FMA, everyone who wishes to fish needs to have a license. This license is open for everyone in exchange for a small amount of money. A set of choice rules restricting the set of actions allowable within the area exist as well. For example, to ensure regrowth, rules regulate the minimum size at which a fish can be extracted from the water. In addition, resources withdrawn ought to be reported to the FMA so as to provide information regarding the existing fish stock, thereby enabling a better monitoring of the resource. Certain scope rules specify in what geographical areas fishing is allowable. For example, some watercourses have been placed under preservation, protecting recent plantation of brood. In one brook, the discovery of an uncommon river pearl mussel resulted in the prohibition of all kinds of fishing activities.

Consequently, rules restrict the resource use in the FMA under study. For a long time, the adherence to these rules was not supervised. Over the years, this matter has been the subject of lively discussions within the FMA board, debating the advantages and disadvantages of imposing a monitoring system. Some argued the absolute necessity of such a system, promoting rule obedience: “I have long argued for supervision, however, many people thought that it would just cause disagreements.” Others hesitated, expecting such supervision would deepen disagreements and result in open conflicts among the users: “I do not like to set rules and force them on others.” However, since 2005 certain monitors have been responsible for supervising the area. In the case of infringements, such as when a person fishes without a valid license, graduated sanctions are imposed. First, the user is informed about the rules and the importance of following them; the second incident results in a reminder, while the third confrontation is reported for law enforcement. “We believe in soft actions, to get everyone to understand what this is all about.” The soft attitude toward rule-breaching is, however, one of the contested issues within the policy network. “What kinds of signals are actually communicated to the fishers? If the rumor is spread, that it does not matter [...], that it is just to continue as usual?”

Accordingly, these rules affect the users and their interactions with each other and with the resource system. Rules stipulate who, how, and where resource utilization is allowable. The rules are monitored, and sanctions are imposed for rule-breaching action. Some of the rules are known and used, structuring the behavior of the actors, while others merely are rules-in-form, viable only on the papers written by the FMA.

8.4.2 The Existence and Spread of Ecological Knowledge

Do the actors involved in the policy process consider the resource system to be complex, non-linear, and characterized by great uncertainty? Does the policy process comprise elements of observations, experiments, and learning?

The users share a fairly common picture concerning the ecological status of the watercourses: “The water is of good quality.” However, some clear divergences are evident, especially between the group of anglers and the representatives of the FMA board. The apprehension of the status of the resource system is a subject of constant

revision. Thus, an ongoing discussion addresses the conditions of the fish and waters within the area.

The users' prevailing ecological knowledge is composed of knowledge based on both local and scientific expertise. Many users have solid experiences, gained from many years of fishing; this knowledge is frequently communicated among the group of actors. Basically, they "see" how healthy the fish are and, based on this information, make judgments regarding the general quality of the waters. "I have lived in the area since the 70s and I am really into fishing. Thus, I dare to say that I know every pool of water." Another respondent indicated that, "You talk with other fishers if something seems strange." Contacts with experienced practitioners and participation in scientific projects give actors a deeper understanding of the complexities of the ecosystem. "We have a good contact network, so we are able to work out the troublesome issues, when we need help from the municipality, the county administration, or the university." Systematic experiments led by the university have been conducted, investigating and inventorying the fish stock in some of the lakes. This collaboration has changed users' perceptions. "The contacts with the university have contributed to a widening perspective. I have learned new things [...] that it is so easy to affect and disturb a water system." Meanwhile, one respondent said, "I had never really considered the fact that the ways we fish have effects on the whole resource stock."

Disparate views exist concerning the reliability ascribed to the prevailing ecological knowledge. The process of mobilizing knowledge is complicated by a number of factors. The large size of the geographical area makes it practically impossible to monitor and keep a record of the whole system, given the restricted amount of resources available. "We know too little in order to adapt the rules." Some watercourses are more popular than others; however, the deficient reporting system complicates the task of gaining reliable feedback about the catches. "People today, they take up a lot of fish, but do not bother to report it back." Finally, respondents emphasize the essential complexity of ecosystems in general as a factor complicating the process of knowledge generation. The bottom line is that it is very difficult to

monitor and achieve reliable knowledge about the status of the system and how different actions might affect its well-being.

However, despite the intrinsic difficulties associated with monitoring, all respondents consider the system to be complex and non-linear and the management process to comprise observations, monitoring, and learning. The actors stress that it is important to comprehend the whole complexity of the system and that it is imperative to deepen their prevailing understanding about the condition of the system in order to improve the adaptability of the management process.

8.4.3 Connection between Rules and Ecological Knowledge

Does a clear connection exist between the conditions of the ecosystem and changes within, as the users comprehend it, and the rule-forming process?

The actors acknowledge a link between the rules governing the area and the conditions of the resources system. The fundamental idea that good management can achieve high quality fishing and healthy waters has, in fact, been widely adopted. Therefore, the actors strive to establish a connection between the rule-forming process and the ecological conditions of the ecosystem. “We have that vision: to change the rules according to the condition of the waters.”

Despite sharing this same view regarding the need for a policy process based on the ecosystem, no agreement exists regarding to what extent these high ambitions are actually effectuated. Some actors claim that ecological criteria do steer policy making, referring to the fact that fishing, or certain types of fishing, has been prohibited in some fishing grounds. Others claim that no real connection exists between the rules set and the prevailing ecological conditions: “The rules have not been set with the health of the resource as a base.” and “The experiments with the university have not changed the rules; however, they have given rise to discussions regarding these matters.” These actors point to other rules that, with regard to the status of the system and the existing fish stock, ought to be changed, but have not been redefined. “There are certain rules I that would like to change.” Net fishing is

one controversy; the types of fish to be planted, the system for supervision, and the need for prohibition in some watercourses are others debated topics.

Regardless of these controversies, the common comprehension is that much more could be done in order to increase the adaptability of the management system. “That is how it should be, but I think that it is really hard to achieve.” Some primary difficulties include the trouble of getting valid knowledge input regarding the health of the system, the difficulty of achieving a common picture of the status of the resource system, and the creation and maintenance of rules. Are these problems somehow reflected in the network structure?

8.4.4 Conclusions regarding the Adaptability of the Process

The perspective regarding the ecological system as being essentially complex, nonlinear, and subject to constant changes is firmly adopted among the users involved in the process of policy making. Despite important variations, a fairly common picture emerges regarding the present status of the system—a picture that is constantly being revised through discussions among the involved group of actors. Input into these conversations consists of local ecological knowledge combined with expertise and scientific knowledge gained through systematic observations and experiments while monitoring the system.

Although all respondents stress that it is important to let prevailing ecological knowledge condition the rule-forming process of the FMA, the rules governing the resource system have been rather constant. Some waters have been preserved in order to meet the new ecological conditions faced; in other cases, rules have not been adapted—a situation that has been called into question by some actors.

What can be concluded from this information? The weak link between the condition of the ecosystem on the one hand and the management process on the other is affecting the estimation regarding the adaptability of the policy network negatively. Ideas concerning the reasons for this are proposed by the respondents themselves; some relate to the ecosystem as such (e.g., the large scale of the system, the inherent complexity of the system) while others are more directly related to the social system

(e.g., ignorance regarding the rule of reporting, differences regarding the comprehensions of the ecological status of the system, problematic issues associated with a lack of rule-conformance). Thus, it is foremost the process of forming and enforcing rules that is deficit, lowering the effectuation of the outspoken ambition to achieve adaptive management in the studied FMA. Is this lower level of performance reflected in the network structure of the policy network?

8.5 Network Structure

This section analyzes the network structure by mapping two types of communication links: the “rule-forming network” and the “ecological knowledge network” (see section 8.3.3). However, the network reflecting the relations of the rule-forming activities will be considered the main unit of analysis since this is the network essentially reflecting the process of institutionalization. The network capturing the flow of ecological knowledge will complement the analysis. Altogether, the social network analysis will provide an extensive description of the network qualities constraining the process of policy making.

The set of questions to be answered can be formulated as such: What kinds of actors participate in the process governing the FMA? Is the network densely and hierarchically integrated or does it consist of disparate subgroups of individuals? In what way is the network of ecological knowledge linked to the rule-forming network? As in Case II, the policy network is studied stipulating two different tie-strengths; both the asymmetric data set and the data set of reciprocated ties (strong ties) are analyzed.

8.5.1 The Whole Rule-forming Network

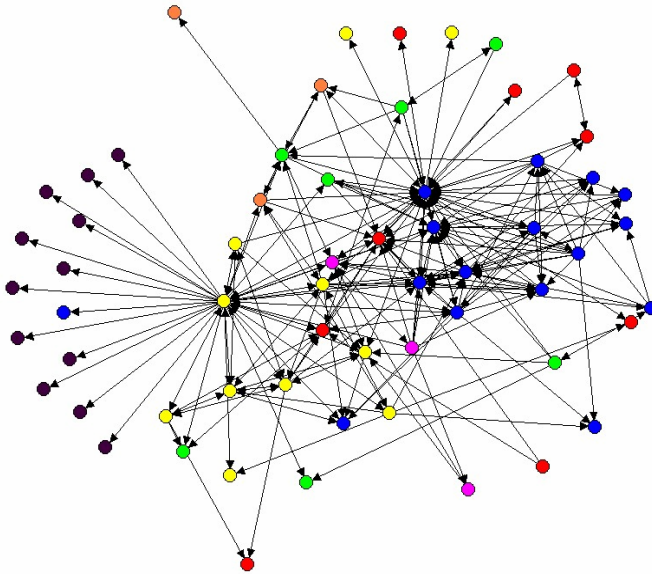


Figure 8.3. The Whole Rule-forming Network

Figure 8.3 presents the network reflecting the FMA rule-forming process⁵⁰. This network consists of 61 actors connected by 247 links. The picture indicates that the network is connected, with an average of 2.5 steps between the actors. The network density is 0.67d, indicating that 6.7 percent of all possible ties are present within the structure. The degree centralization index is 51 percent, while the betweenness centrality is significantly lower at 27 percent. These numbers suggest a high level of hierarchy. The type of advantage attached to the position of having many connections is unequally distributed. Meanwhile, the low level of betweenness centrality suggests that no important actors broker the flow of information within the network (see section 5.2.2). Many alternative communication paths are present.

The nodes in Figure 8.3 are colored by sector. FMA board members are blue, members of the anglers' association yellow, commercial actors orange, and local

⁵⁰ Each relation is given the value of 1. The data set is asymmetric and includes directed ties, which means that ties might or might not be reciprocated.

people involved through various projects run within the area green. Together, these actors also constitute the group of community actors. The red nodes are representatives from the political and administrative sector, found both at the local and regional levels. Actors from the scientific community are colored pink, and black nodes represent those whose sector is unknown⁵¹. Evidently, the network contains an immense variety of different kinds of actors. In Figure 8.4, the distribution of actors within the whole rule-forming network is presented. In addition, the proportion of actors with fishing rights (property holders) is visible.

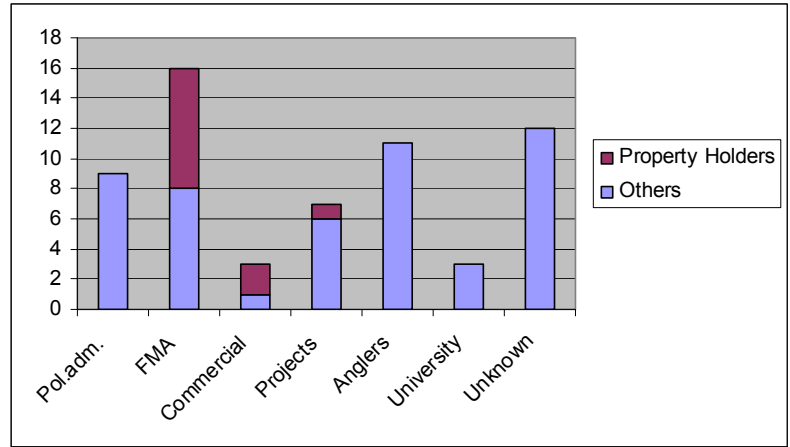


Figure 8.4. Actors of the Whole Rule-forming Network

If the group of unknown actors is set aside, FMA board members make up the largest group, followed by the anglers and the political/administrative actors. If the community actors are treated as one group, they make up approximately 60 percent of the actors. A relatively small minority, 18 percent, of those involved in the process of policy making have formal fishing rights (despite the fact that FMAs were formally property based co-management systems).

Table 8.1 presents the cross-boundary exchange of the whole rule-forming network. The links connecting the group of unknown are excluded from the analysis.

⁵¹ It is rather safe to assume that many of these actors are, in fact, representatives from the local community.

Table. 8.1. The Cross-Boundary Exchange of the Whole Rule-forming Network

	<i>Public</i>	<i>FMA</i>	<i>Commercial</i>	<i>Projects</i>	<i>Anglers</i>	<i>University</i>
<i>Public</i>	7	6		2		
<i>FMA</i>	11	72	1	3	6	3
<i>Commercial</i>	2	2	2	2	1	
<i>Projects</i>	1	12	2	4	2	1
<i>Anglers</i>	8	21	3	6	36	2
<i>University</i>	1	7			4	5

The proportion of cross-boundary exchanges is considerable in that 46 percent of all relations are bridges between people with different affiliations. A substantial part of these linkages are connections between the anglers and FMA board members. As a matter of fact, as many as 57 percent of all ties are within or between these two groups.

The feature of heterogeneity was also examined to study the centrality indices of the individual actors. This analysis revealed that, when considering the degree centrality measure, the FMA board dominated the policy-making process. When the analysis is based on the betweenness centrality index, the higher centrality scores are more evenly distributed among the groups. However, regardless of the aspect of centrality adopted (i.e., whether based on degree or betweenness), two individuals are distinguished as being significantly more central than the others: members of the FMA board and the anglers association.

8.5.2 The Strong Rule-forming Network

The reasons for conducting social network analysis using only the stronger, reciprocated ties have already been argued in previous chapters of this thesis. The central argument is that the stronger networks capture the more stable connections and reveal the more robust structure of the social interactions. It is also easier to grasp and interpret the graphs generated from this type of data. Therefore, Figure 8.5 presents the strong rule-forming network of repeated and reciprocated ties⁵².

⁵² In this data set, ties going in only one direction are excluded from analysis. The existence of a reciprocated link connecting two actors was coded as 1.

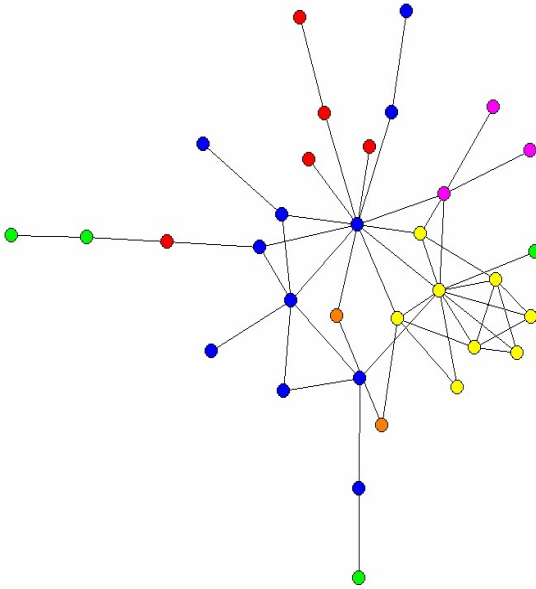


Figure 8.5. The Strong Rule-forming Network

This network consists of 33 actors linked by 49 symmetrical relations. The density is 0.93d, which is higher than the rule-forming network previously analyzed (Figure 8.3). Obviously, the network is connected. The graph further implies the presence of subgroups; much indirect communication is evident in the structure, indicated by the many “lines of actors.” The comparatively higher average distance of 3 (the same measure was 2.5 in the whole rule-forming network) further supports this notion. A subgroup of yellow nodes can be detected on the right in the figure. The subgroup analysis reveals two groups, one group of anglers and one group primarily constituted by the FMA board.

The centralization indices of the strong rule-forming network show a distinct pattern that departs from what was found in the whole rule-forming network. The degree centralization is significantly lower, only 30 percent, while the betweenness centrality is remarkably higher, 56 percent. Thus, many brokers exist in this network upon whom the communication flow is vitally dependent upon. This information confirms

the comprehension of a structure with an indirect communication pattern visible in Figure 8.5.

The sector-belongings of the strong rule-forming network basically correlate with the proportions found in the whole rule-forming network (see Figure 8.4), with the exception that no unknown actors are present. The proportion of property-holding actors is also considerably larger, at 27 percent. However, the structural analysis puts these actors in the peripheral parts of the network, as illustrated in Figure 8.6, where these proprietors are colored blue while the rest are red.

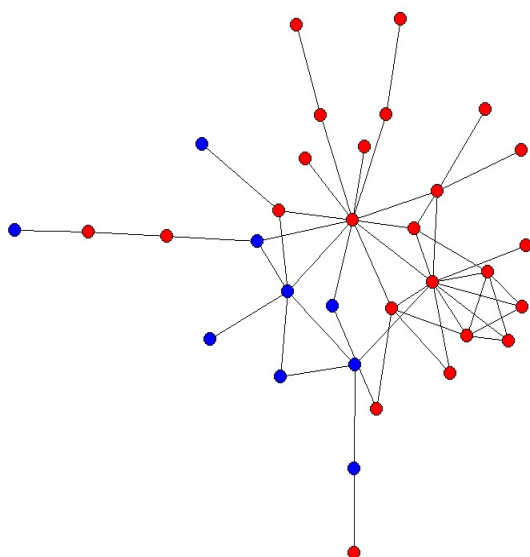


Figure 8.6. Property Holders in the Strong Rule-forming Network

The general patterns regarding the cross-boundary exchange of the strong rule-forming network are summarized in Table 8.2.

Table 8.2. Cross-Boundary Exchange of the Strong Rule-forming Network

	<i>Public</i>	<i>FMA</i>	<i>Commercial</i>	<i>Projects</i>	<i>Anglers</i>	<i>University</i>
<i>Public</i>	2	4		1		
<i>FMA</i>	4	26	1	1	4	1
<i>Commercial</i>		1	2		1	
<i>Projects</i>	1	1		2	1	
<i>Anglers</i>		4	1	1	30	2
<i>University</i>		1			2	4

As indicated, 33 percent of the relations make up bridges between different sectors. This number is lower compared to the whole rule-forming network, a fact that supports the assumption that stronger ties are less bridging than weaker ones (Granovetter 1973; Friedkin 1980). Within this network, the FMA board and the anglers also represent the most active groups in a sense that they connect with many other actors. A considerable majority, 64 percent, of all ties are within or between these two groups.

The affiliations of the ten most central actors were studied. When considering the degree centrality scores, five anglers, four from the FMA board and one academic representative are found among the top ten. Regarding the betweenness centrality, the distribution of actors is even more diversified, including actors from the public/administrative sector as well. The great importance ascribed the FMA board and the anglers association justifies the purpose of looking more closely at the structures within these two constellations. This is the topic next.

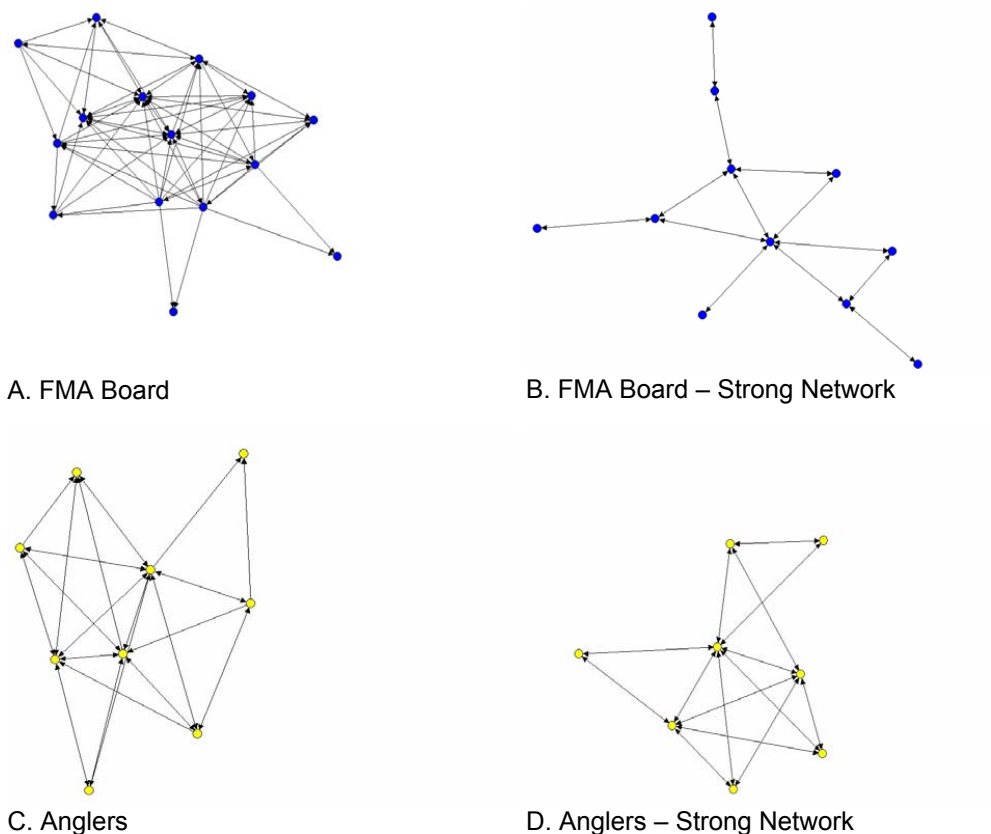


Figure 8.7. Network Analysis of the FMA Board and the Anglers association

Figure 8.7 shows the patterns of social interactions within the two indicated groups. Notice the changes in the FMA group when the stronger rule-forming network is considered: It becomes less dense and much more fragmented. However, the group of anglers has a structure characterized by a significantly higher level of closure; as such, it is less dependent upon brokers, or gatekeepers, to achieve a free flow of communication. Accordingly, this, together with the other SNA data, supports the conclusion that the strong rule-forming network consists of one coherent subgroup of anglers but is, on the whole, much more incoherently structured.

8.5.3 The Network of Ecological Knowledge

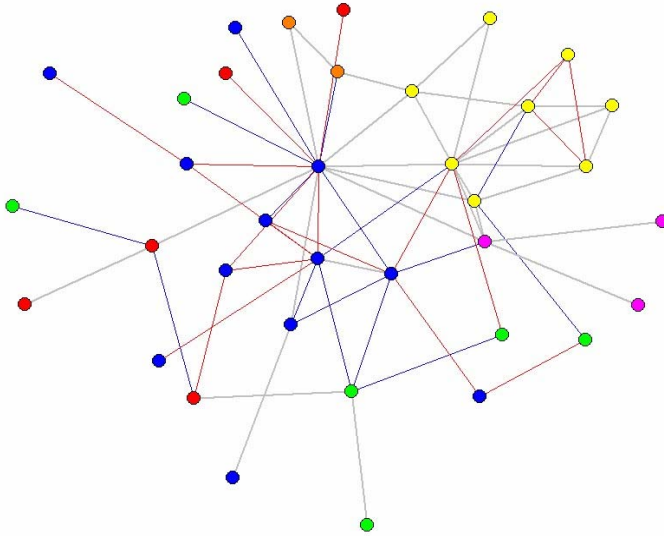


Figure 8.8 Overlap between the Rule-forming Network and the Ecological Knowledge Network

Figure 8.8 presents a network composed of both types of social relations: those concerning the rule-forming process and those concerning the ecological knowledge. The nodes are colored according to actors' affiliations. In this picture, the links also have different colorings based on their content. Red links represent relations concerning the rules and routines of the FMA, while blue links represent communications concerning the ecological status of the area; grey links connect actors who communicate with each other regarding both matters. Thus, as this figure demonstrates, an overlap exists between the two networks, indicating that knowledge is input into the process of policy making. Figure 8.9 presents images of the ecological knowledge network.

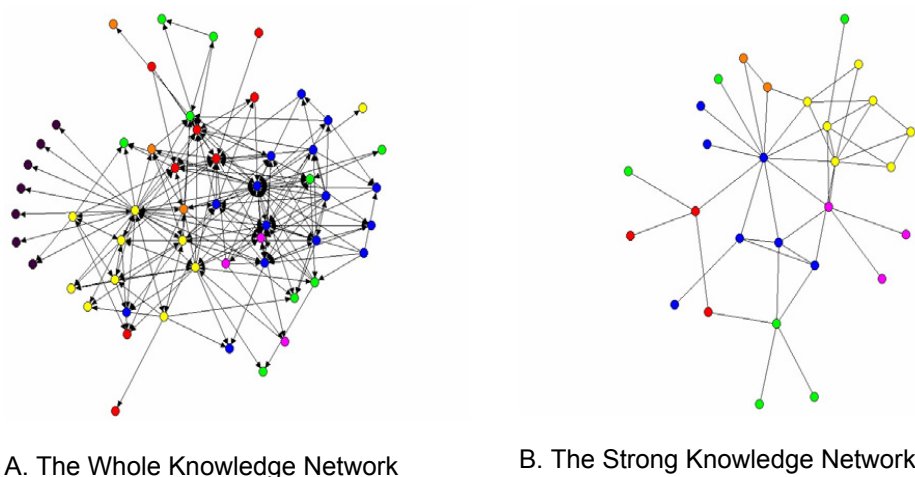


Figure 8.9. The Ecological Knowledge Network

Network A, on the left in Figure 8.9, describes the knowledge network constituted by actors who repeatedly communicate with one another concerning the ecological status of the FMA⁵³. Network B, on the right, consists of the repeated and reciprocated links only⁵⁴.

The whole knowledge network (Network A in Figure 8.9) consists of 55 actors connected by 237 links. The density is 0.79d, which means that nearly 8 percent of all possible linkages are present within the network. This is higher than the same figure in the whole rule-forming network. The degree centralization index is 44 percent, and the betweenness centrality is 27 percent—significantly lower values than those found in the whole rule-forming network.

The proportions of actor distributions are approximately the same as in the whole rule-forming network (see Figure 8.4) while the cross-boundary exchange within the

⁵³ Each relation is given the value of 1. The data set is asymmetric and includes directed ties, which means that ties might or might not be reciprocated.

⁵⁴ In this data set, ties going in only one direction are excluded from analysis. The existence of a reciprocated link connecting two actors was coded as 1.

whole knowledge network is higher, as 55 percent of all linkages connect people with different affiliations.

The centralization scores of the participating actors have also been measured. The great dominance of FMA actors found in the rule-forming network is not present within the whole knowledge network, implying a greater diversity. Still, the same two actors dominating the policy activities are distinguished.

The strong knowledge network (Network B in Figure 8.9) consists of 28 actors connected by 90 connections. This gives a density of 0.12d, which is considerably higher than the same measure in the strong rule-forming network. Still, the picture reveals a network composed of separate clusters (see Figure 8.9). No core coordinates the communication flow. The subgroup analysis shows that this is a correct deduction. The results indicate one coherent group of anglers, one group consisting of the FMA board, and one mixed group. The degree centralization is only 35 percent, while betweenness centrality is high at 50 percent. Thus, although the density measure is higher, the network is characterized by a fragmented structure. Figure 8.10 presents the distribution of the actors within the stronger knowledge network.

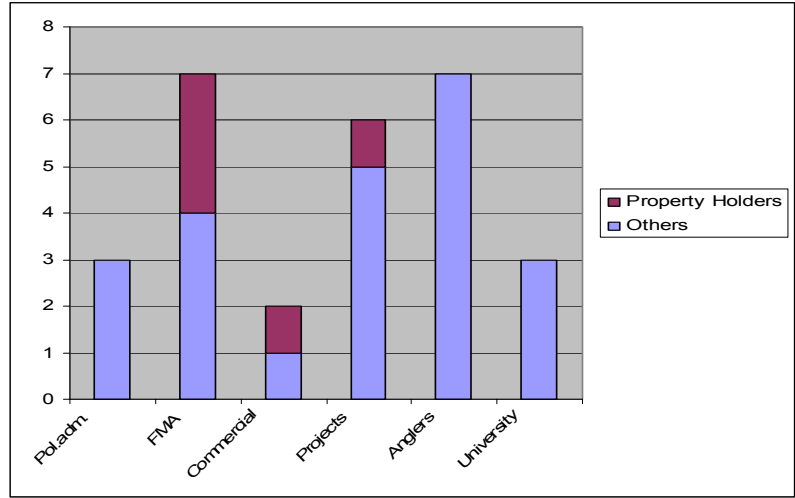


Figure 8.10. The Actors of the Strong Ecological Knowledge Network

It is important to note that, compared to the rule-forming network, the conglomerate of actors here is different. The FMA board and the anglers are equally represented in the diagram. The cross-boundary exchange is 40 percent, higher than in the strong rule-forming network. When studying the list of the most central actors, the notion of extensive diversity emerges. All sectors are represented; still, the FMA board and the anglers association are the most prominent. The next section summarizes the social network analysis and determines the levels of network closure and network heterogeneity for the studied policy network.

8.5.4 Conclusions Regarding the Network Structure

No indisputable answers emerge to the questions regarding the structural properties of networks raised in the introduction of this chapter. The answers evidently depend on what level data is analyzed and what SNA measures are used to confirm the interpretations. However, some interpretations are more valid than others. Table 8.3 summarizes the empirical data. What conclusions regarding the network structure might be drawn based on this summary?

Table 8.3. The Social Network Measures

<i>Social Network</i>	<i>Size</i>	<i>Density</i>	<i>Degree Centralization</i>	<i>Betweenness Centralization</i>	<i>Cross-Boundary Exchange</i>
Whole Rule-forming Network	61	6.7	51	27	46
Strong Rule-forming Network	33	9.3	30	56	33
Whole Knowledge Network	55	7.9	44	27	55
Strong Knowledge Network	28	12	35	50	40

The structure of the rule-forming process will first be approached (see the first two rows of Table 8.3). The level of network heterogeneity is considerable, acknowledging the fact that a diverse set of actors is participating in the process of policy making and that the level of cross-boundary interaction is high, or at least moderately high.

Regarding the level of network closure, the empirical measures are more ambiguous. The density level within the whole rule-forming network is modest, given its restricted network size. Meanwhile, the level of degree centralization is higher, implying a hierarchical structure. The strong rule-forming network has a higher density, but also a structure with a high betweenness centralization combined with a low degree of centralization index. This feature might in fact reflect an inefficient communication structure for policy making and should therefore be considered to indicate a lower level of closure (see Figure 8.5). Thus, the main inferences regarding the structure of the rule-forming network related to the FMA are that it is heterogeneous, but with a moderate level of network closure.

The ecological knowledge network (the two lower rows in Table 8.3) is highly heterogeneous. It is composed of a great variety of actors, and a high proportion of the network activities are crossing borders. The knowledge network is connected with relatively higher density measures. However, the fact that this network is smaller than the rule-forming networks must be taken into consideration when interpreting the higher density measures, additionally: the network is composed of multiple centers (see Network B in Figure 8.9). Also within this network, the measures and the balance of the centralization indices negatively affect the comprehensions of closure. The low level of hierarchy, indicated by the centralization measures, is quite visible in the more fragmented structure in Figure 8.9. Thus, the network structure of the ecological knowledge network is perceived as highly heterogeneous with moderate levels of network closure.

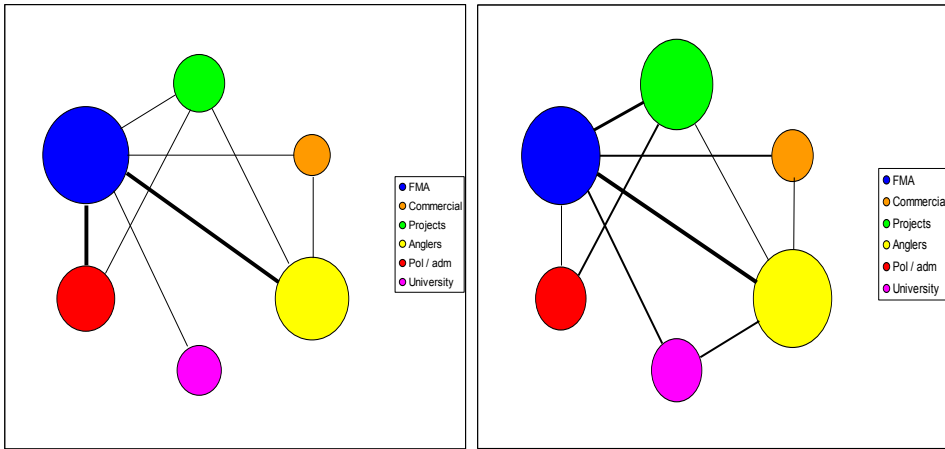


Figure 8.11. Network Structure of the Rule-forming Network and the Ecological Knowledge Network⁵⁵

Figure 8.11 provides a general overview of the social networks generated in this chapter and complements the information provided by Table 8.3. The first picture reflects the rule-forming network, and the second the ecological knowledge network; both are calculated based the statistics describing the whole networks. The size of the nodes reflects the number of representatives from each group while the thickness of the lines reflects the strengths of the interactions. In the next and final section of this chapter, this information will be related to the performance of the policy network.

8.6 Preliminary Conclusions

In this concluding section, the two variables—network structure and adaptability—will be brought together for a comprehensive analysis, addressing the relation between the two. The main empirical inferences regarding the aspect of adaptability are summarized in the right side of Figure 8.12. Interview data indicate that the policy process is adaptive in some aspects and not as adaptive in others. The actors do share an ecosystem perspective, the process contains elements of both observation and learning, and a clear goal exists to let the prevailing knowledge base affect the process of policy making (i.e., forming the criteria for when and how the rules should

⁵⁵ The pictures have been made in Excel based on the social network data.

be changed). Despite this highly set goal, the FMA has not been that active in changing and developing new rules for regulating the appropriation of the resource.

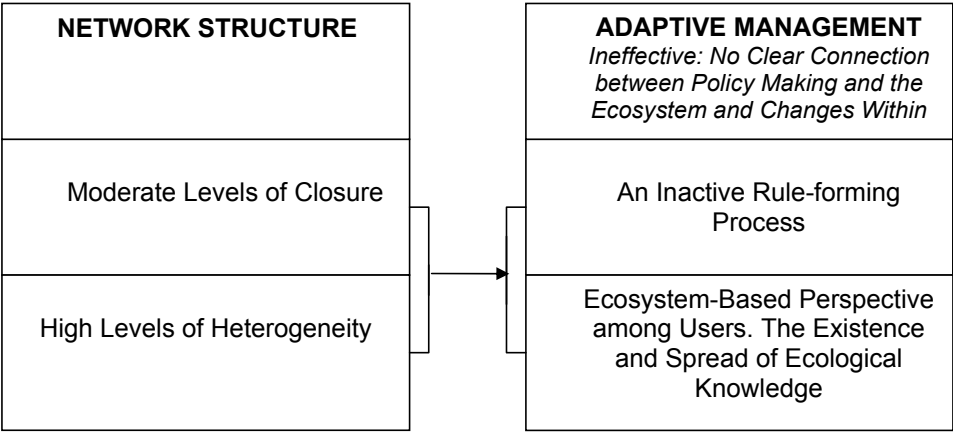


Figure 8.12. Empirical Data concerning Network Structure and Performance

The reasons for this ineffectiveness, indicated by the absence of a clear connection between policy making (i.e., setting of rules) and the perceptions of the ecosystem, are recognized by the respondents. There are problems associated with rule-conformance, fishing permits, minimum sizes, and the reporting system. The process also suffers from an absence of common viewpoints regarding the status of some of the watercourses, which blocks the opportunity for institutional change. How are these deficits in adaptability related to characteristics of the social network? The following hypotheses concerning how network structure impacts the performance of NRM were presented at the beginning of this chapter:

H1. Network closure promotes the process of problem definition and prioritization, conditions that are necessary for collective action. In other words, this feature can be related to the efficiency of the rule-forming process within the policy network.

H2. Network heterogeneity promotes the process of resource mobilization—in this case, knowledge about the ecological system. This in turn fosters the

existence and spread of ecological knowledge among the users, which is a prerequisite for an effective rule-forming process based on prevailing knowledge about the ecosystem and changes within this system.

The left box in Figure 8.12 presents the empirical information regarding the network qualities of the policy network. The network is characterized as heterogenic and with moderate levels of network closure. Thus, the theoretical propositions presented herein are supported by the empirical analysis. The inactive rule-forming process might in fact be related to the lower levels of network closure. Rules are changed when the benefits for changing these rules are greater than the costs for doing so (Ostrom 2005). The collective-choice rules, determining who is entitled to participate in this rule-forming process, and the bargaining strengths of these actors determine its outcome. This situation is revealed by the social networks generated.

Applied to the FMA, institutional change would require a network that is better, more densely, and more hierarchically interconnected. In particular, a closer interaction between the two most important subgroups of actors—the FMA board and the anglers—would be necessary. The anglers have primarily pointed to the experienced need for a rule change. However, despite being the major user group, they lack the formal mandate to participate in the rule-forming activities, which presumably negatively affects their bargaining strengths. The minor involvement of property-holding actors is another factor that might have contributed to the blocking of the policy-making process.

The problem of achieving a common picture in regards to the state of the ecosystem among these two main groups has been emphasized as one of the main factors behind the inactivity. This problem might be related to the lower levels of network closure as the sparse structure promotes a situation in which different interpretations regarding the importance and actual substance of certain rules compete. Divergent understandings concerning fundamental issues, given by the low level of closure within the structure, might indeed negatively affect both rule conformance and the rule-forming process.

Moreover, the hypotheses spoke to the importance of network heterogeneity. The heterogeneity of the policy network might be related to the ecosystem perspective shared by the respondents. The interviews confirm the assumption that contact with experts and academic actors, through different projects, has in fact deepened their knowledge about the ecosystem and changed their perceptions to better acknowledge its great complexity.

The social network analysis reveals an overlap between the rule-forming network and the ecological knowledge network. The knowledge input into the process of policy making is a prerequisite for adaptive policy making. Thus, the incapability of establishing a clear connection between the prevailing knowledge and the rule-forming process is foremost related to the low level of closure within the rule-forming network. Although ecological knowledge exists, collective action is not achieved.

This chapter aimed to test whether the findings from previous case studies were confirmed when studying a policy network within a NRM setting (see section 8.2). The analysis points to an affirmative answer to this question. Adaptive policy making is a process that is both efficient and effective. Essentially, the challenge is no different from that approached in Cases I and II. The processes are all aimed at creating policy settings in which a diverse set of actors, with dissimilar knowledge bases and opposing interests, can unify and conciliate around a policy problem, adjust and adapt in order to prioritize, and achieve joint action. The importance ascribed to network closure and network heterogeneity, their affect on different organizing functions, and the essential intertwined relationships between these two variables have been confirmed in the case study.

As high levels of density, indicating high levels of closure, promote homogeneity in values, warnings have emerged about systems being too dense as they might reduce knowledge diversity incorporated into the management process (Bodin 2006). Similar ideas about how overly high levels of in-group closure might decrease effectiveness have been suggested by Oh, Chung, and Labianca (2004). Applying these thoughts to this case study, high closure in the latter type of network (ecological knowledge

network) could in fact be obstructing the process as diversity and the promotion of different views are important for the creation of new knowledge—something that a structure with many local structural holes would counteract. Thus, perhaps, in the best of worlds, NRM networks should have a rule-forming network characterized by heterogeneity and closure as well as a highly heterogenic network with low level of closure for mobilization of ecological knowledge.

The preliminary suggestion concerning relations between network structures, organizing, and performance of co-management networks is summarized in Figure 8.13.

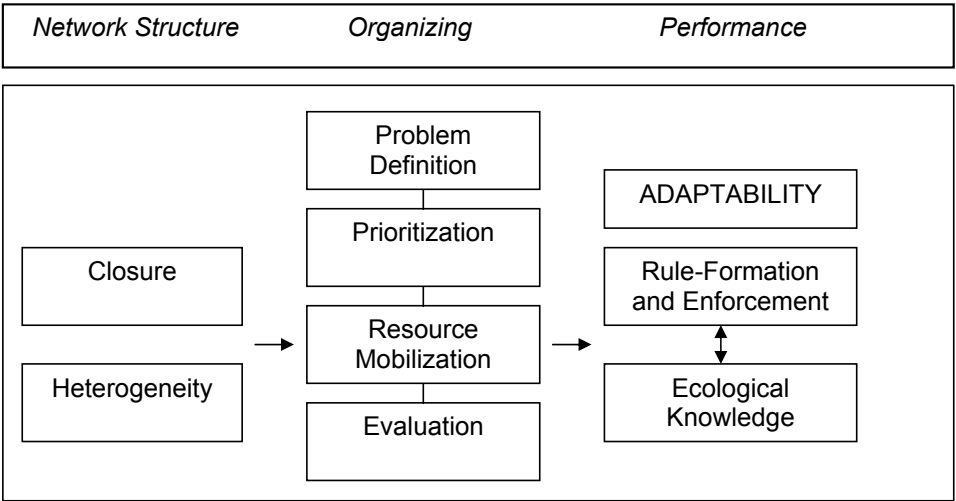


Figure 8.13. Network Structure, Organizing, and Performance in Case III

The conclusion of this chapter also ends the empirical part of this thesis. Network structure and performance have been addressed in three divergent policy settings and on various analytical levels. In the next and final chapter of this thesis, the findings will be summarized and synthesized, answering the questions regarding how network structure impacts policy making and performance. Does a connection exist between the variables—network structure and network performance—independent of context?

CHAPTER NINE

Policy Networks: The relationship between structure and performance

The increasing importance that networks have been ascribed in public policymaking, the lack of systematic knowledge about these structures, and the possibility provided by SNA were, in the introductory pages of this thesis, called upon as reasons to justify the scope of this thesis. The challenging question is whether the network structure of a policy network can explain performance and if SNA is a suitable tool for exploring this potential power. In regards to these issues, knowledge gaps have emerged. Moreover, an increasing part of the problems that formal decision makers face requires solutions that can only be obtained through the establishment of cross-boundary collaboration and related resource mobilization. Such networks—crossing formal organizational and hierarchical levels—are often considered a necessity due to tasks related to achieving high quality education, economic development within peripheral regions, or the establishment of adaptive co-management of natural resources. Consequently, networks and networking are important concepts on today's political agenda, yet knowledge about these entities is lacking. Two broad sets of questions have guided the work within this thesis:

1. Does a relation exist between the network structure and the organizing capacities and performance of policy networks? If so, what kind of network qualities affect performance and in what sense?
2. Is SNA a valuable tool for policy analysis? Is the method capable of enhancing policy network research as well as supporting theoretical and conceptual development within the field? If so, in what way?

Thus, this thesis has a theoretical as well as a methodological aim. In this concluding chapter, these questions will be brought to a close. The general findings and the implications for policy science and policy making within contemporary society will be discussed. The limitations given by the adopted research design will also be addressed. Before dealing with these issues, a short summary of the theoretical framework and the findings from the empirical case studies will be provided.

9.1 Theoretical Framework and Research Design

In the theoretical part of the thesis, the nature of policy networks was discussed. Referring to ideas related to policy, networks, institutions, and social capital, an analytical skeleton framing the questions why and in what way the network structures of policy networks are likely related to their organizing capacities and performance was presented. Policy networks were assumed to be the result of purposeful action, bringing together divergent actors in bargaining games dealing with various kinds of resources for the sake of solving current problems. As a result of these bargaining activities, a web of relations comprising the involved actors and their interactions is created. The network structure (i.e., the pattern of these interactions) frames the institutional rules affecting the involved actors and their strategic behavior, and vice versa. Thus, relationships' arrangements and configurations are assumed to impact the process of resource allocation and institutionalization and, accordingly, the performance of policy making.

With the notion of social capital as a frame of reference, the importance ascribed to network structure was even further accentuated. Some networks are assumed to have more favorable qualities than others. Two particular network qualities—closure and heterogeneity—were adopted from previous network research (for example, Burt 2000) as being central for the process and its outcome. The following hypotheses were formulated:

- H1. The network structure matters for policy making within policy networks and affects performance, in terms of their efficiency and effectiveness.

More specifically,

H2. Two central network qualities—namely, network closure and network heterogeneity—have an effect on performance in terms of their efficiency and effectiveness. Although heterogeneous networks are rich in resources, network closure is critical for the use of the resources obtained.

Consequently,

H3. A high performing policy network is a heterogeneous network with a high level of network closure. This is empirically indicated by a network structure that is dense and centralized and contains a diversified set of actors involved in cross-boundary interactions. Variations in performance might be related to varieties in these network qualities.

These hypotheses were applied and tested in three different case studies: in the creation of new knowledge areas within the higher education sector, in the establishment of a regionally based research station aimed at enhancing local economic development, and in the process of adaptive fishery management. The research design and the adopted logic of analysis were described in Figure 5.1 in Chapter 5.

Network performance, although somewhat differently operationalized in each case study, was examined using the notions of efficiency and effectiveness. Whereas efficiency refers to the internal processes of the interactions and the ability to achieve collective action, effectiveness refers to the quality of what is achieved. The network properties were studied with the point of departure in closure and heterogeneity (the latter was used as an indirect indicator of the existence of global structural holes). Network closure was empirically indicated by higher levels of density and centralization. Heterogeneity was indicated by the diversity of actors and the level of cross-boundary interactions (see Chapter 5). Despite obvious differences among the cases, such as the policy context and specific problems to be solved, they all dealt with cross-boundary collaboration, struggling with the challenge to achieve collective action and innovative results. Each case study contributed to the aim of this thesis by elucidating the relation between network structure and performance in its specific

setting. Most importantly, the chosen design enabled us to approach the intriguing question: Is there is a connection between the variables—network structure and performance—independent of context?

9.2 Network Structure, Organizing, and Performance

The theoretical findings generated in this thesis are illustrated in Figure 9.1. Due to variations in network closure and network heterogeneity, the figure illustrates four ideal types of networks. How these images correlate with the organizing functions of prioritization and resource mobilization and performance in terms of efficiency and effectiveness is presented by the scales on each side of the table. The findings of each of the three case studies will now be summarized and discussed as related to this figure.

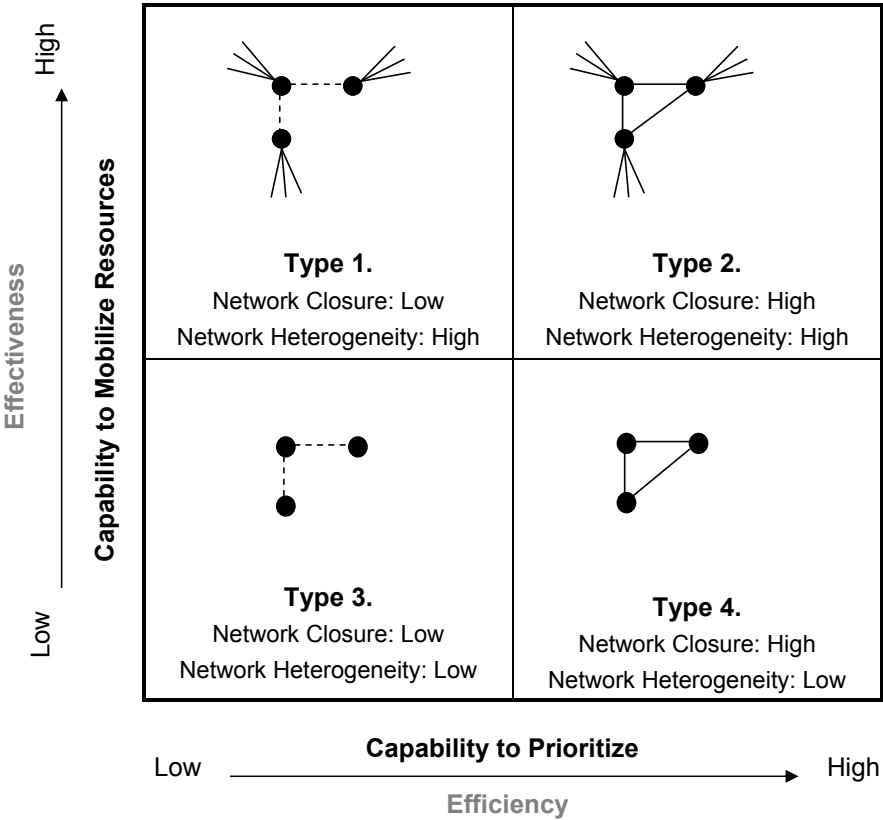


Figure 9.1. Findings Regarding Network Structure, Organizing, and Performance

In Case I, a multiple comparative case study of five networks was performed. The networks were situated in the higher education sector and engaged in cross-boundary collaboration with the task of forming innovative multidisciplinary organizational units within a university—so-called knowledge areas or arenas. Although the networks had been given the same assignment and the same formal prerequisites, network performance diverged significantly. The aim of the study was to outline whether the network structure could explain the variations in outcomes.

The empirical comparison concluded that network structure does affect the organizing capacities and performance. A clear connection exists between the level of closure and the efficiency of collective action. The most efficient networks in that case study (Networks A and C) can be placed in the right column of Figure 9.1. Hence, an efficient network has a tightly connected and centrally coordinated structure. The empirical data also elucidated a positive relationship between effectiveness and the level of network heterogeneity. The more innovative networks (Networks C and D) are situated in the upper row of Figure 9.1. Following this, an effective network contains a multitude of various actors involved in cross-boundary exchanges. The results of the study support the notion that high performing networks (i.e., networks that are both efficient and effective) share two specific qualities: they are closed and heterogeneous, as exemplified by Network C in the first case study. Thus, Network C represents a Type 2 network (see Figure 9.1).

Based on the generated findings, two new hypotheses specifying the relationship between structure and performance were suggested. The empirical analysis showed that two organizing functions in particular seemed to determine a successful process: prioritization and resource mobilization. Relating these functions to particular network qualities propositions served as tentative explanations as to why structure matters for the process of policy making.

First, it was proposed that the function of prioritizing, so vital for the process of collective action to continue, is better facilitated within dense and centrally integrated networks. The existence of many communication channels and commonly recognized coordinators fosters the establishment of a mutual understanding that facilitates the

convergence of divergent wills, a necessity for collective or joint action to evolve. Presumably, it should be easier to come to terms with what to do and how to do it within the kinds of configurations represented by Type 2 and Type 4 networks in Figure 9.1. Second, it was suggested that the function of mobilization of resources might be more facilitated within networks with a more heterogeneous character. Although networks with homogeneous sets of actors might indeed have an advantage in the process of prioritization, when it comes to the mobilization of resources, heterogeneity seems to be the determining factor. Heterogeneous networks with actors that span many global structural holes, exemplified by the networks of Type 1 and Type 2 in Figure 9.1, have an advantage because of their likely access to a wider diversity of resources. In other words, policy making is dependent upon the “need” for resources as well as the capacity to use them. These ideas are also illustrated in Figure 9.1.

Case II, a single case study of a triple helix network, was concerned with a program aimed at establishing a Research Station and a related School of Research in the region of East Norrbotten. The policy network included actors from the public, academic, and economic sectors for the overall sake of promoting local economic development. The general aim of the study was to test and further develop the overall theoretical hypotheses as well as the findings generated in Case I.

The empirical results confirm the hypotheses regarding the affects of network closure and network heterogeneity, respectively. A lower level of heterogeneity could be related to a lower level of goal fulfillment or effectiveness. The proposed relations between tasks of prioritization and resource mobilization on the one hand, and closure and heterogeneity on the other were supported by the empirical data. For example, the unsuccessful attempts to really involve one group of key actors (those representing the economic sector) in the policy process resulted in a lack of resources, such as the experiences, perspectives, and knowledge held within this category of actors. The studied policy network can be placed somewhere in the right column of Figure 9.1, describing a closed and efficient structure. However, the moderate level of heterogeneity, or the unbalanced heterogeneity, indicates that the network is a structural mix between a Type 2 and Type 4 network. The consequences

of having this type of structure were also reflected in the lower level of effectiveness in network performance.

The empirical analysis of this case also points to the fact that the constellation of actors, forming a certain type of structure in control of one function, does affect and reinforce the formation of the constellations in control of other functions. To exemplify, for the sake of prioritization, a homogenous network characterized by high level of closure might be advantageous; however, the lack of actor diversity at this stage of the process might obstruct the task to mobilize new actors as the process continues, leading to a resource scarcity further on in the work. Thus, since effectiveness is dependent upon the existence of network heterogeneity, this feature is important in the performance of all functions of the policy process, regardless of the difficulties it might bring, such as lowering the ability to advance quickly due to the enhanced complexity regarding purposes, interests, and goals as well as means involved. It is likely that, if the economic actors had been involved early in the process of problem definition, affecting the agenda of the bargaining game and ensuring that “their” issues were on the agenda, these actors would have been considerably more engaged in the work related to the Research Station.

The policy process in Case II also demonstrates the great potential of network interactions. It became clear how “closed” network interactions, within structures situated in the right column in Figure 9.1, foster agreements and compromises and how actors can overcome contrasting logics and reconcile differences in the favor of mutual adjustment and joint action in such structures.

In Case III, the policy network of a fish management area (FMA) was studied. Performance was reflected by the adaptability of the process. Adaptive policy making is a process in which a clear connection exists between the rule-forming activities and the status of the ecosystem and changes within. An ecosystem perspective among the users, elements of observation and learning, ecological knowledge inputs, as well as a capacity to form “rules-in-use” with this information as a base are important prerequisites for a policy process of this kind to be successful. Consequently, it is a process that is both efficient and effective.

The findings of the case study further verify the effects that network closure and network heterogeneity have on policy making. The network can be placed in the upper row Figure 9.1, indicating network heterogeneity. However, the moderate levels of closure place the network in the left column of the figure. Thus, the policy network of this case is a reflection of a Type 1 structure. The heterogeneous character of the policy network has ensured the existence of ecological knowledge in the process; however, the policy network suffers from a poor or inactive rule-forming process. This lack of efficiency in the policy process could be linked to the moderate levels of network closure, not at least since this type of structure makes it difficult to reach common agreements regarding the status of the ecosystem and what the proper actions to respond to it are. The findings underscore the important fact that, in search of the favorable structure, it is necessary to define what quality and what aspect of success is desired.

Accordingly, based on this summary and on the findings illustrated by Figure 9.1, the first question of this thesis can be answered. A relationship exists between network structure and the organizing capacities and performance of policy networks. As the level of closure increases, so does the capability to prioritize, thereby enhancing efficiency. However, the level of network heterogeneity is positively related to the function of resource mobilization promoting effectiveness. Accordingly, a high performing policy network has a network structure in which the actors are tightly connected and, at the same time, have many connections to other actors engaged in other constellations.

When it comes to the ambition of merging relevant stakeholders in cooperative structures, the policy processes in all three case studies are similar. They all represent processes “aimed” at creating policy arenas in which a diverse set of actors with dissimilar knowledge bases and opposing interests struggle to unify and conciliate around a policy problem, adjusting and adapting in order to prioritize and achieve joint action. The fact that they are embedded in different contexts make the implications for policy making and public management even more relevant—issues that will be discussed further on in this chapter. Here, it can be concluded that it seems to be a relationship—between network structure and performance—

disregarding policy context. Thus, the first question of this thesis has been answered. The relationship between the variables has been clarified, contributing to fulfilling the knowledge cap concerning in what way network structure might explain the performance of policy making.

9.3 Social Network Analysis in Policy Science

Not only was the aim to elucidate how different network qualities affect performance, the thesis also had a methodological aim to indicate in what way SNA contributes to and enhances policy network research.

The lesson learned from the studies upon which this thesis is based has demonstrated some obvious advantages of using SNA. Generally speaking, the method enables research on abstract concepts that are frequently referred to in many scientific projects, but not measured empirically as often. SNA forces the researcher to actually operationalize ideas about actors, network collaboration, and social capital, concepts that often are difficult to express. The quantitative measures are on the one hand difficult to work with, since essentially complex and qualitative aspects have to be transferred into considerably more simplistic measures; however, at the same time, this procedure enhances the preciseness, transparency, and stringency of the analysis. One superior advantage of the formal method is that the weaknesses related to the procedure of both data collection and data analysis are more exposed and, thereby, easier to take into proper consideration.

The application of SNA contributes to a better understanding of the social phenomena under study. The attention that social network analysts ascribe to the relational qualities of the objects brings new and different angles since it facilitates an integrated analysis of both individual and structural data. SNA is, no doubt, a powerful descriptive tool. The quantitative measures and the graphical images enhance the process of analysis. The data provide crucial information about both the overall network structure and the relational properties possessed by particular individuals that is not that easily obtained through the use of a qualitative approach only. As a matter of fact, it is difficult to think of any other method better suited for the assignment of mapping and analyzing policy-making networks.

SNA has not been that commonly used within political science and policy science (see, for example, Adam and Kriesi 2007). However, considering questions relevant to these fields, the possibilities are many. To use Dahl's (1984) widely accepted conception of power as "basically a relational phenomenon," the perspective and method provided by SNA are quite compatible. Issues regarding power and influence are intrinsically incorporated into the designs. For example, questions associated with the distribution of authority within a system, reflected in the overall level of hierarchy, can be approached. By investigating the network properties of the particular actors, their positions within the network, and the characteristics of their connections, the most influential persons can be distinguished, etc.

The application of SNA is, therefore, an obvious and promising step forward for policy researchers adopting a network approach. In doing so, the theoretical and conceptual development and our knowledge about policy making provide significant potential for progress. The findings of this thesis, framed by the network qualities of closure and heterogeneity, presumably contribute to our understandings of policy making and provide an example of how SNA might enhance policy research. Accordingly, the answer to the second question of this thesis is: SNA is a valuable tool for the analysis of policy. By measuring the "unmeasured" qualities of networking, SNA has great potential to enhance policy network research, supporting the theoretical and conceptual developments within the field.

9.4 Implications for Contemporary Policy Making

An essential task for policy analysis is to increase our understanding of policy making in order to improve the capacity to deal with joint problem solving. The three case studies included in this thesis all incorporate goals of forming collaborate structures for solving such problems. The expectations regarding what these kinds of collaborative networks might achieve are often highly set from formal public policy makers. Since this is a rather common attitude in contemporary policy making, implied by the shift from government to governance, the experiences outlined in this thesis are likely to be relevant and applicable to other sectors as well beyond those studied herein. This fact strengthens the generalizability of the study. The contribution to policy science and methodology has already been discussed, but in

what way can the acquired knowledge be utilized by formal policy makers? How can the very abstract ideas regarding policy networks be transformed into applicable knowledge that would enhance the practice of public management? In this section, the implications of the findings for contemporary policy making are discussed.

9.4.1 Certain Structures are More Favorable than Others

The concept of “network management” has gained increased attention and is currently a recurrent theme in research on public management (Bogason and Toonen 1998; Kickert et al. 1997; Koppenjan and Klijn 2004; Klijn, Koppenjan, and Termer 1995; O’Toole Jr. and Meier 1999). Basically, this line of research adopts a managerial perspective and engages in issues concerning how public sector managers’ best approach policy problems in the search for better and more effective structures for their solution. In what way do the findings of this thesis contribute to this task?

Basically, two types of network management exist: “game management,” which aims to influence the initial prerequisites of the given networks’ interactions, and “network structuring,” which aims to change the conditions for collaboration by elaborating with actors, rules, resources, and perceptions (Klijn et al. 1995, 442). Thus, strategies for managing networks are available. Whether it concerns state management or management on any other level within public administration, it is feasible to identify key stakeholders, develop links, and steer relationships in order to achieve desirable outcomes (Stoker 1998). Although the governance perspective questions the superiority of public actors, due to their unique possession of resources (such as legislation power, budgets, personnel, access to mass media, and democratic legitimacy), such actors have substantial power to affect policy processes (Kickert et al. 1997). The term *metagovernance* points specifically to the actions taken by elected representatives, being anchored in the traditional democratic structures, in order to steer and control policy networks (Sorensen and Torfing 2005). Policy analysis should contribute to this task by presenting knowledge that can underpin recommendations about how to achieve what is regarded as good governance through various programs.

Based on generated knowledge about how network structure affects the organizing activities and performance, management should focus on creating network structures that are well adapted to their purpose and that also are durable in the sense that these structures need to be resilient to occasional changes in the set of involved actors. This is a challenging task and perhaps only an unattainable goal for those working with these issues on a daily basis. Nevertheless, it is vitally important for public sector managers to adopt a network perspective and regard policy creation and implementation as a multi-actor process. It is equally important to pay attention to the determining qualities of these network structures and the interaction within them. Depending upon what managers try to achieve, lessons can be learned from the findings of this thesis—namely, that certain structures are more favorable than others. This fact is, for example, illustrated in Case III that studied systems of co-management in which it became obvious that, while the task was forming rules, structuring the appropriation of the resource might be enhanced by closed network structure; the supply of ecological input in the policy process is more dependent upon the existence of a heterogeneous set of actors.

Apart from the findings relating closure and heterogeneity to performance, there are other insights that are applicable for those aiming to create and manage policy networks. There are evidently major limitations in the possibility for central authorities to steer implementation processes from the top. The divergent outcomes in the development of new networks within the higher education sector in Case I provide support for this well-known fact. However, at the same time this case also illustrates the actual possibility to foster the creation of new networks. Management can, with the use of different incentives, encourage collaboration and resource allocation between actors who would not otherwise have met and worked together. Without neglecting the difficulties associated with managing networks, the possibility to establish frameworks, fostering the development of effective and innovative policy networks is argued.

Case I also confirms the intuitive understanding that networks that already exist are more easily mobilized and initially more efficient than others. It is easier to decide what to do and what not to do for actors already known to each other. This finding

supports the idea that cross-sector collaboration is facilitated if prior relationships exist that foster the trustworthiness among the players (i.e., when some “degree of structural embeddedness” is present) (Bryson, Crosby, and Middleton Stone 2006). Consequently, for the sake of efficiency, change might preferably be channeled through these existing structures; old networks might be used for new purposes. However, in some situations, not the least contemporary attempts to introduce new ideas and methods or concepts, the creation of new networks is vital.

A determining factor of network evolvement is whether cooperation seems to be rationally motivated by the relevant actors. Only networks that are the result of, and answer to, real and experienced needs have the potential to grow successfully, as illustrated in Case II in the answers given by those entrepreneurs who chose not to engage their time and effort in the projects related to the Research Station. Since their involvement in the early stage of problem definition and prioritization was minor, the design of the projects did not meet their expectations, which resulted in them leaving the process. This fact reinforces the idea that the process of problem definition and the set of actors that participate in this process are crucial for the outcome of the process as such. It is not possible to “design” successful policy networks based on the assumption that certain key actors will put effort into solving someone else’s problem. This is an important starting point for everyone aiming to establish network collaboration.

This thesis has contributed to our understanding of network management by pointing to two network qualities that are important to consider for formal policy makers and public administration. To promote effectiveness, there is a need to develop multi-actor structures in which private and public actors cooperate in order to pool resources and agree on joint priorities. However, for the sake of efficiency, achieving a local structure that is dense and centrally coordinated is also important.

Another factor facilitating efficiency is the degree of hierarchy, while the importance of a coordinating actor has proven vital. The efficiency of collective action is dependent upon the existence of a free flow of communication because this facilitates the establishment of common values. Actors, who are tightly connected, either

directly or indirectly, can more easily agree on a common agenda. The mutual adjustment between the academic and public actors in Case II is an empirical example of this convergence. In a way, this process illustrated the potential of network interactions, how the process of bargaining can in fact contribute to create an added value for those involved. For the sake of establishing sustainable collaboration and to hinder opportunistic behavior, it is important for management to create frameworks that foster dense and centralized network structures, not at least exemplified by the governing of natural resources discussed in Case III. The lack of communication flow between the two main groups within the rule-forming network of this case study is likely to explain the inactivity and absence of a needed policy change.

The empirical results also point to the importance of network heterogeneity. Networks that span many holes in the global structure enjoy advantages related to mobilization or resources. Management should therefore encourage collaboration among persons possessing critical resources. Platforms that encourage such inter-organizational interactions are to be facilitated. In some cases, actors that possess certain types of attributes might be more important to involve than others. The involvement of scientific expertise in Case III explained the rise and spread of ecological knowledge within that policy network. In Case I, for example, it is likely that the exclusion of administrative representatives might have affected the performance of Network E negatively as the structure did not possess knowledge about the administrative routines within the university. These two examples stress that it is important to establish networks possessing the appropriate resources.

When the creation of new networks is the ambition, the timetable given for the process to evolve is critical. An example is the development of Network D in Case I. This process was characterized by a problematic phase of prioritization and by endless compromises. It must therefore be realized that the establishment of new policy structures takes time and there might be cutbacks regarding their efficiency.

9.4.3 Management Issues Rephrased into Network Terms

Based on the discussion thus far, issues of concern for public administration could be rephrased into network terms, acknowledging the structural impacts on policy making processes. For example, when it comes to the existence of stagnated policy-producing structures, could the lack of innovativeness be explained by the lack of heterogeneity among the actors? Old, well-established policy structures containing actors with similar ideas, values, and approaches might, in fact, be efficient in achieving their goals, although not that groundbreaking. Thus, it is likely that the degree of innovation would be promoted within another type of network. Furthermore, the inability to mobilize the necessary resources for a given policy process can be explained by the lack of relevant actors (i.e., those who span holes in the global structure of the policy network in question). When legitimacy is the fundamental resource, the reason for implementation failures is likely to be found in the inability to involve certain key actors. How could this important organizing function be related to other actor attributes, such as gender (Sandström, 2004b)?

On the other hand, too great of a diversity among the actors could be the explanation for why a certain policy network is incapable of joint action. Could a poor prioritization process be handled by the creation of a proper platform for communication among the participants? Alternatively, could the establishment of a strong coordinating unit solve the low level of accomplishment?

Policy is often riddled with conflicts. This begs the question of whether policy areas characterized by conflict are related to certain network structures, such as networks made up of many and distinct subgroups? The assumption would be that such networks lack the consistency in opinions that is presumably better facilitated within closed networks. On the other hand, networks with a closed structure, presumably characterized by a lower level of conflict, might lack the innovative qualities promoting a needed policy change.

All these issues touch upon the intriguing question about the role of the state and government authorities. In what way can the many faces of the state adapt to the new role indicated by the governance framework? This discussion exemplifies how

challenges of joint problem solving might be translated and rephrased into network terms, incorporating “network structures” as one important factor for policy makers and public administrators to consider when designing policy programs.

9.4.3 Networking is not a Panacea

In the literature on governance, the existence of different kinds of networks is often regarded as effective solutions to “wicked problems” in society. Policy structures are thought to promote the identification of new problems and new opportunities, sustain the input of new information, compose arenas for conflict resolution, and decrease the risks of implementation failures (Sorensen and Torfing 2005). As in the discussion of Case III, which dealt with natural resource management, prevailing ideas about the advantage of co-management provide an illustrative example of what these structures are assumed to achieve. The negotiations and bargaining relationships among the users, researchers, and public representatives are believed to enhance the supply of knowledge to the process and ensure that conflicts are solved in the best way possible, eventually promoting the legitimacy of outcomes.

However, networking should not be perceived as a universal solution to all societal problems faced by policy makers. In fact, networks might be equally ineffective as other types of structures; they might foster conflicts and block action. “Collaboration is not a panacea; it is a choice that policy makers and public managers should make based on evidence about expected outcomes” (Koontz and Thomas 2006, 111). Achieving successful collaboration is difficult (Bryson et al. 2006). As the quotation above emphasizes, network management (or metagovernance) must be focused on what is regarded as a successful outcome.

9.5 Research Agenda for the Future

Working with this thesis has resulted in the acknowledgement of some important questions that remain unanswered. In addition, certain issues concerning the method call for more attention. This is the topic for the final section of this thesis.

9.5.1 Theoretical Issues for Future Studies

Troublesome issues affect the definitions, the operationalization of the dependent and independent variables, and the possible direction of the relationship between the two. As implied by the theoretical framework, a dialectical relationship exists between network structure and network activities, with one affecting the other. Although the analytical design treats network structure as the independent variable and performance as the dependent variable, it must be acknowledged that the relationship, in some respects, can be reversed.

It is not clear how closure and heterogeneity affect one another, nor how they relate to other network qualities, such as size. Generally speaking, a deepened knowledge about how these network qualities affect one another is highly relevant for the field. For example, it might be questioned whether the relationship between the two network variables and performance should necessarily be considered as linear? Does performance always increase with higher levels of network closure and heterogeneity, or are there other types of relations present among the variables? Are higher levels of density and centralization always “better,” or is there some optimum value?

As discussed in the preliminary conclusions of Chapter 8, warnings have been issued about what overly high levels of density might cause in reduced levels of diversity. Is there in fact a trade-off effect present in the sense that one has to choose either of the two? This issue has previously been addressed by Bodin, Crona and Ernstson (2000) and more recently by Carlsson and Sandström (2008).

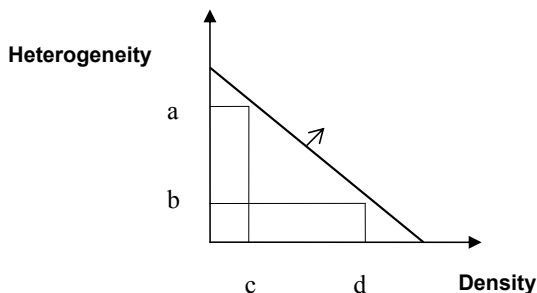


Figure 9.2. Trade-off between Density and Heterogeneity (Carlsson and Sandström 2008)

Figure 9.2 graphically illustrates the presumption about a trade-off effect between heterogeneity and density. Although the idea about a counterbalance between the two is intuitively likely, the actual relationship has not been demonstrated empirically, nor has it been demonstrated how a shift in the directing of the arrow in Figure 9.2 might be performed.

One finding that is related to this discussion and that emerges when the cases are comprehensively analyzed is that the data support “the weak-tie hypothesis,” as formulated by Granovetter (1973) and empirically tested by Friedkin (1980), among others. In Cases II and III, the networks were analyzed stipulating two different tie strengths, letting reciprocity indicate stronger ties. The analysis verified that the level of cross-boundary interaction was lower within the stronger networks, indicating lower levels of heterogeneity. Thus, weaker ties cross more boundaries than stronger ties do.

Reasons also emerged for discussing the very definitions and operationalization of the variables used in the thesis. The reasons for applying the concepts of network closure and global structural holes were presented in the theoretical chapters. However, the idea of merging density and centralization into one measure (closure) might be questioned, not the least of which is because this restricts the possibility to disentangle how density and centralization affect performance separately. For example, centralization alone might be the determining factor of efficiency.

The choice of focusing on efficiency and effectiveness, examining performance, is another line of action that might be discussed. Other variables are likely important to study, such as legitimacy and democracy. The governance framework and the policy network approach, in which this thesis takes its point of departure, essentially challenge the normative notions of democracy that substantiate the traditional view on government and politics (see section 1.1). Issues concerning authority, power, and the link between those who govern and those being governed (addressed as the problem of accountability) are somewhat problematic for political theorists adopting a governance perspective. One branch of research seeks to address issues of this kind, and attempts have been made to find empirically applicable frameworks in which the level of democracy of network governance structures can be evaluated (Bevir 2006;

Bryson et al. 2006; Fell 2007; Fung 2006; Leach 2006; Lundqvist 2004; Sorensen and Torfing 2005; 2007; Stoker 1998). Democracy—as complex as it is given its various meanings—is even further complicated within the governance framework. Perhaps more correctly formulated, the governance framework sheds light on the real complexity of policy making and politics that has always been there, but has been seriously neglected due to the focus on the structures of government as well as formal authorities and their influence on policy making (compare with the top-down approach to policy analysis). Although the policy networks in this thesis have not been evaluated due to their democratic qualities, there is certainly a need to address the normative issues concerning democracy, legitimacy, and participation that inevitably arises when doing policy network research. To sum up, these are all highly relevant topics for further research.

9.5.2 Methodological Issues for Future Studies

Despite the potential of SNA, as argued in section 9.3, certain limitations are associated with the use of a formal network method, which has become apparent within this thesis. These limitations are partly true for the method in general and partly true for how it has been applied and implemented in this thesis. The major point proposed in this section is that, although the quantitative nature of SNA is an advantage of its use, the need for a robust qualitative analysis cannot be ignored—nor should it. It is, as always, the choices, formulations, analyses, and judgments done by the researcher that determine the quality of the analysis.

Issues with the reliability and validity have emerged concerning the procedure of data collection as well as the analysis of data, many of which were discussed in Chapter 3. Relational data, collected through surveys, are completely dependent upon how the question in the questionnaire is formulated. It is as difficult as it is crucial to formulate the question in such a way that it truly captures the relevant features of the interactions. Nevertheless, the question is always open for various interpretations by the respondents. The report deficiency for sociometric questions is also an area of concern as network data are highly dependent on how each respondent reports his or her connections; as such, the answers given by each actor have a great influence on the overall characteristics of the analytical network generated. Although actions have

been deliberately taken in order to restrict the negative impact of these conditions, the correlation between reported and actual interaction could certainly be regarded as a bit problematic. The validity and reliability associated with SNA are indeed challenging and vital topics for further research.

Another problem, more associated with the analysis of data, has to do with the fact that the interpretation of the SNA measures is a delicate task. No general cut-off values exist. When is a measure of, for example, density to be regarded as high or low? In Case I, this dilemma was ameliorated by using a comparative approach and explicitly presenting how and with what criteria the translation of different measures into network properties was carried out. However, in Cases II and III, being single case studies, the use of comparison was not available, underscoring the drawback for the validity of the analysis and the conclusions drawn. As such, the judgments concerning the qualities of these networks based on the SNA measures might be discussed.

The limitations referred to here point to restrictions given by the adopted research design and the method. These weaknesses have been considered and are believed to have been handled in the best way possible given the circumstances. More research is needed in order to progress our knowledge about how network structures affect the performance of policy making. One possible step might be to broaden the analytical framework by including a broader set of performance variables and to improve the framework so that the relationships between various network qualities and how they affect one another are included. In doing so, the complexity of how networks influence policy making could be more effectively captured. Table 9.1 presents a set of potentially important variables to consider in such a framework.

Table 9.1. Variables in a Framework for Policy Network Analysis

<i>Policy Network</i>	<i>Organizing Process</i>	<i>Performance</i>
N1 Size	O1 Problem definition	P1 Efficiency
N2 Subgroup structure	O2 Resource mobilization	P2 Effectiveness
N3 Density	O3 Prioritization process	P3 Innovativeness
N4 Degree Centralization	O4 Evaluation process	P4 Representation
N5 Betweenness Centralization		P5 Inclusion
N6 Diversity of Actors		P6 Legitimacy
N7 Cross-Boundary Interaction		P7 Transparency

In order to determine the links between the variables, extensive research on a larger set of case studies in a comparative design using similar methods would be needed. In doing so, the search for “design principles”⁵⁶ of policy networks could be continued. Furthermore, a project of this kind could also improve our knowledge about the comparability of the sociometric measures and enhance both the validity and reliability of SNA for policy science.

Finally, if our knowledge about the network structure of policy making is improved, the task of predicting policy change would be possible. For example, by drawing upon the ideas proposed by Adam and Kriesi (2007), raising the question about how structure is related to policy change, SNA provides proper tools for dealing with this highly relevant issue empirically. To conclude, the set of challenges that emerged in this thesis point to possibilities that are significant for a future research agenda.

9.5.3 Concluding Remarks

The trend from government to governance is noticeable both within the area of formal policy making and within the scientific community analyzing policy making and its outcomes. In this discussion, policy networks are a social construct that has been ascribed significant attention. However, research treating networks as

⁵⁶ Compare with Ostrom’s (2005) design principles for resource management systems. These were formulated inductively based on a large set of empirical case studies performed within the field. A similar line of action would be fruitful in dealing with issues related to network structure and its impacts.

explanatory variables has not been as common. This thesis has shown that it is imperative to develop the standpoint that networks do matter for the performance of policy making and, therefore, need to be treated seriously. Network structure is an important variable to consider since it says something about the organizing capacities of policy networks and is related to what is achieved within these structures. Furthermore, the formal analytical approach offered by SNA has proven to be a promising tool when performing policy analysis. Clearly, a lot of explanatory power exists in the concept of policy networks; the use of a formal network approach is one way to explore such possibilities. Certainly, more theoretical and empirical work is needed to further develop our knowledge about how and why networks matter. A research agenda of this kind would reinforce the concept of policy networks as beneficial for both policy science and contemporary policy making.

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APPENDIX A

Central Theoretical and Methodological Concepts and their Definitions

Bounded Rationality The concept of bounded rationality, launched by Simon (1957), acknowledges constraints related to an actor's capability to collect and process information in decision making situations. Individual action is constrained by, for example, existing knowledge and cognitive capacities framing the calculations and, thereby, the choices made. In this thesis, the bounded rationality of individual action is assumed.

Centrality Centrality is a SNA measure describing how centrally positioned an actor is within a given structure. Different notions of centrality exist based on *degree*, *closeness*, and *betweenness*. Degree centrality takes the number of direct connections into account, closeness centrality considers the distance of one actor to all the other actors, and the measure of betweenness rests upon the idea that the centrality of an actor depends upon the extent to which an actor is located "in between" two other actors (Hanneman 2004).

Clique A clique is a group in which all actors are connected and to which no other actor can be added without this property being lost (Wasserman and Faust 1994). Accordingly, it is a matter of complete mutuality among a set of actors.

Collective Action Collective action is "actions taken by members of a group to further their common interests" (Bogdanor 1987, 113).

Core/periphery Structure If a network has a core/periphery structure, it has a core of closely interconnected actors and has links to the actors in the peripheral part of

the structure. Although these peripheral actors are related to the core, they are not related to each other (Borgatti and Everett 1999; Everett and Borgatti 1999).

Governance Governance is understood as a process by which policy is produced within multi-actor structures beyond formal hierarchy. Governance can be perceived as a process that “includes the setting of rules, the application of rules, and the enforcement and adjudication of rules” (Feeny 1988, 172). The concept refers to a process in which actors create collective institutions and politics, outside formal hierarchies (Hertting 2003). To govern is to make rules—formal or informal—that are perceived as binding for a given set of actors.

Government The term government is in this thesis used as a reference to policy-making structures associated with formal a political-administrative hierarchy.

Global Structural Hole This concept refers to structural holes in the global structure of a network. The global network structure refers to how the network in question is connected to other constellations of actors. In this thesis, the existence and extent of these holes, as well as bridges over them, are empirically measured by the level of network heterogeneity (i.e., the level of actors’ diversity and cross-boundary exchange). The essential argument is that a higher level of heterogeneity indicates a larger amount of bridges over global structural holes.

Implementation Network See *implementation structure* above.

Implementation Structure “An implementation structure is comprised of subsets of members within organizations which view a program as their primarily (or an instrumentally important) interest” (Hjern and Porter 1993, 253). In this thesis, the term is used synonymously with implementation network, referring to the set of actors involved in policy production, policy networks, and governance structures.

Innovation To innovate is to introduce something new. As such, an innovative network is in this thesis regarded as a network that results in the creation of a new concept. The concept of innovation is frequently used in social sciences relating to

“all the ideas, lines of actions or objects that are perceived as new” (Borell and Johansson 1994, 33, own translation). An innovative process might be described as “an activity over time that produces originality, complexity and action itself or in its result and that is based upon a certain knowledge base” (Innovativa Processer 2003, 320, own translation).

Institution An institution “transcends individuals to involve groups of individuals in some sort of patterned interactions that are predictable, based upon specified relationships among the actors” (Peters 1999, 18). According to North (1997, 1990), institutions are “the rules of the game” or, as formulated by Ostrom (2005, 3), can be broadly understood as “prescriptions that humans use to organize all forms of repetitive and structured interactions.” Rules are thought of as “the set of instructions for creating an action situation in a particular environment” (Ostrom 2005, 17).

K-plexes This measure is applied to map the existence of subgroups within a given structure. It is a more relaxed version of a clique as it allows for missing links within the group (Scott 2000).

Network Centralization Network centralization measures to what extent the connections within a network are centralized around one actor, meaning the extent to which an actor dominates the network activities. In other words, it measures how “star-shaped” the network is. First, the differences between the highest centrality score (i.e., the centrality score of the most central actor) and the centrality scores of each of the other participants are determined. The differences are then summarized. Second, the result of the calculation is divided by the maximum possible sum of the differences (Scott 2000; Wasserman and Faust 1994). Network centralization can be calculated based on degree, closure, or betweenness (see centrality).

Network Closure A network characterized by closure is a network with a high level of interconnectedness—that is, a network in which the actors are linked directly to each other by many and strong relations or indirectly through a single contact. In this thesis, the level of network closure is positively related to the degree of network density and network centralization.

Network Density Network density gives a measure of the overall activity, or interconnectedness, within a network. By dividing the actual number (or tie strengths) of connections by the maximum number of connections (or tie strengths) possible, a general density measure for the network structure is calculated (Scott 2000).

Network Effectiveness In this thesis, effectiveness (also termed *external* effectiveness) is recognized as the ability to produce the desired result or the ability to reach the organizational objectives.

Network Efficiency Efficiency (also termed *internal* effectiveness) refers to the internal organizing process and the relation between performance and the costs for performing, pointing to the effort and resources required to produce the desired results.

Network Heterogeneity Network heterogeneity refers to the diversity of the actors regarding some important attribute, such as gender, background, or—as in this thesis—organizational units and sectors of society. The level of cross-boundary exchange between the actors is also taken into consideration. Network heterogeneity is treated as an indicator of bridges over global structural holes.

Network Hierarchy The concept of hierarchy refers to the distribution of authority within a network. Herein it is measured by the overall network centralization. The more centralized the network is, the more hierarchical its structure is.

Network Outcome See *network performance*.

Network Performance Network performance, used synonymously with network outcome, refers to both the intended and unintended outcomes of the networking process. In this thesis, it refers to the problem-solving capacities of the network and is empirically indicated by effectiveness and efficiency.

Network Structure Network structure refers to “how the direct relations are combined or arranged in a network” (Friedkin 1981, 41). Thus, it is a reflection of the patterns of interaction.

Organizing Functions Policy is not only decided; it also emerges as people organize themselves in policy networks. This process might be analytically ordered in four organizing functions—namely, the process of *problem definition*, *prioritizing*, *resource mobilization*, and *evaluation*. All organizational processes are dependent upon the performance and coordination of these tasks.

Politics Politics may be defined as “a process whereby a group of people, whose opinions or interests are initially divergent, reach collective decisions which are generally regarded as binding on the group, and enforced as common policy” (Miller 1997, 390). In this thesis, the process of making politics is considered to be no different from the process of making policy.

Policy Network Policy networks consist of actors and their relations involved in the process of policy making. They are regarded as “problem-specific entities, organizing a policy area by different forms of collective action” (Carlsson 2000, 508). In this thesis, policy networks are perceived as organized entities reflecting institutional arrangements and with the potential capacity to form institutional norms and rules that structure the behavior of the participating individuals.

Policy Policy is defined as “a set of ideas and the practical search for institutional arrangements for their realization” (Hjern 1997, 3).

Social Capital Social capital refers to the “resources embedded in a social structure which are accessed and/or mobilized in purposive actions” (Lin et al. 2001, 12). This selected interpretation indicates that social capital has two main aspects: resources and relations. The existence of social capital indicates some sort of advantage that comes from the social structure.

Social Network A social network is defined as “a set of players and a pattern of exchange of information and/or goods among these players” (Annen 2001, 451). Thus, a social network consists of the participating actors and their relations.

Social Network Analysis (SNA) A formal method based in mathematical graph theory and matrixes algebra that allows for a quantitative analysis of social structures. The method is applied in a wide range of scientific disciplines.

Structural Hole. Structural holes are defined as the absence of connections, or as the presence of weaker connections, within networks. Metaphorically, they are holes in the social net. “Holes are buffers, like an insulator in an electric circuit. People on either side of a structural hole circulate in different flows of information” (Burt 2000, 353).

Subgroups Subgroups are a distinguished set of actors within a network. They are in some ways more interconnected with each other than they are with the rest of the network. “Cohesive subgroups are subsets of actors among whom there are relatively strong, direct, intense, frequent, or positive ties” (Wasserman and Faust 2000, 249). Thus, there are different approaches to defining subgroups.

APPENDIX B

Case I Interview Questions

The Process of Problem Definition

How was the work related to the specific knowledge area initiated?

1. Describe the initial stage of the work related to the knowledge area.
 - a. How did you get involved in the strategic work? Why did you get involved?
 - b. How did the basic idea/concept of the knowledge area emerge? What kinds of ideas and concepts were expressed and proposed? What did you do and with whom?
 - c. Which other persons took part in the procedures?
 - d. Were some persons more central than others during these procedures?

The Process of Prioritizing

Why did the process turn out the way it did? How did the involved actors decide what to do and what not to do? How did they choose between different ideas and courses of action?

1. What happened next? Specifically describe how the concept of the knowledge area was formed.
 - a. How did you decide on the content of the knowledge area? Describe the process. What courses were given, what research was pursued, etc? What were the existing alternatives? What criteria guided the process? What did you do and with whom?
 - b. Which other persons took part in the procedures?
 - c. Were any persons more central than others during these procedures?

The Process of Resource Mobilization

1. What kinds of resources were needed? Were those resources available? How did you proceed in order to mobilize the necessary resources (money, knowledge, information, time, existing contact network, etc.)? What did you do and with whom?
 - a. Which other persons took part in the procedures?
 - b. Were any persons more central than others during these procedures?

The Process of Evaluation

1. Have you evaluated the work during the process?
2. How did you know whether the work was going in the right direction or not?
3. Looking back, what kinds of actions have been successful/unsuccessful?

APPENDIX C

Case I Questionnaire

Arena X

Nr: _____

Directions

About the questionnaire

- On the following page is a list of all the persons mentioned during the interviews regarding the development of Arena X. Your assignment is to mark the persons with whom you have discussed issues related to this work. You are also requested to estimate the frequency of those discussions.
- If you have discussed the development of Arena X with persons not on the list, you should *add those names* to the list and estimate the frequency of the discussions.
- If you have not participated in any discussions related to the development of Arena X, you should leave the *questionnaire blank*. However, it is still important that you return your answer.

Please note

- The question refers *only* to discussions related to the development of Arena X.
- The question refers *only* to the time period from when the work was initiated until the Arena started, meaning when the first students started their education.
- Your answer will be treated confidentially; in the subsequent compilation of results, each individual will be presented only as a node in a network. Therefore, a high level of anonymity can be guaranteed.

1. Indicate with whom you have discussed the development of Arena X by marking the box that best describes the frequency of the discussions.

My name is: _____

Name	Several discussions	Occasional discussions	No discussions at all
Actor A			
Actor B			
Actor C			

Many thanks for your participation!

APPENDIX D

Case II Interview Questions

A. General Questions Guiding All Interviews⁵⁷

Name

Education

Present Position

Relation to East Norrbotten Research Station

1. Describe your initial contact with the process related to East Norrbotten Research Station.
 - a. How did you become involved?
 - b. What is, from your point of view, the general aim of the Research Station? Why is the work important? What kinds of problems does the Research Station address?
2. Did you participate in the initial part of the process? In what way?
 - a. Tell what happened. How was the idea initiated? Describe the discussions. How did you decide on the basic concept of the Research Station? What criteria were used to define how the process of prioritizing was carried out? How did you identify and mobilize the necessary resources (money, knowledge, information, etc.) How did you know that the work was going in the right direction?
 - b. Who participated in the activities above? With whom were you in contact/did you collaborate?
 - c. Were some people more influential than others? If so, who?

⁵⁷ Applied in its total when interviewing representatives from the Political/Administrative Sector

3. Did you participate in the development of some of the specific Ph.D. projects?
In what way?
- Describe what happened. How did you decide on the specific projects/areas of research? Describe the discussions. How did you decide upon the specific content of the projects? What criteria guided this process of prioritizing? How did you identify and mobilize resources (money, knowledge, information, etc.)? How did you know that the work was going in the right direction?
 - Who took part in the activities above? With whom were you in contact/did you collaborate?
 - Were some people more influential than others? If so, who?
4. In what way are you involved in the Research Station today? Describe your involvement, including:
- Activities related to the Ph.D. projects.
 - Other activities.
 - Other actors participating in the above-mentioned activities. With whom are you in contact/do you collaborate?
5. Describe your experiences of working with the other actors involved in the process. (The following questions are asked according to the actor interviewed.)
- Describe your contacts with the university. What previous experiences have you had working with universities? What expectations did you have regarding the role of the university in this process? Have these expectations been fulfilled? Why/why not? Were these contacts new contacts? Have your knowledge about and perceptions of the academic sector changed as a result of this process? If so, in what respects?
 - Describe your contacts with the local economic life. What previous experiences have you had working with entrepreneurs within the region? What expectations did you have regarding the role of the entrepreneurs in this process? Have these expectations been fulfilled? Why/why not? Were these contacts new contacts? Have your knowledge about and

- perceptions of the economic sector changed as a result of this process? If so, in what respects?
- c. Describe your contacts with the political/administrative sector. What previous experiences have you had working with representatives from this sector? What expectations did you have regarding the role of the political/administrative sector in this process? Have these expectations been fulfilled? Why/why not? Were these contacts new contacts? Have your knowledge about and perceptions of the political/administrative sector changed as a result of this process? If so, in what respects?
 - d. How have you perceived other actors' expectations of the sector that you represent? Have any conflicts of interest emerged during the process—for example, concerning the goals and means of getting there? If so, how have these differences been handled?
 - e. What reactions have the Research Station caused among your colleagues?
6. Do you think that the concept underpinning the Research Station might serve as a model for future projects? Why or why not?
- a. Has the process thus far had any impact on the region? Is the common citizen aware of the activities? If so, in what way? Do you think that the process will have any effect on the regional development (short term/long term)? Do you think that the Research Station is a tool addressing the problems it aims to address? Why/why not? Problems and possibilities? How do we know whether the Research Station is a success or not?

B. Additional Questions for Ph.D. Students

Name

Education

Present Position

Relation to East Norrbotten Research Station

The Process of Problem Definition

Why was the work with the specific research project initiated?

1. Describe the initial phase of working with your project
 - a. Why did you become engaged in the project?
 - b. What was your attitude toward the Research Station and its goals in a more general sense?
 - c. What is the aim of your project? How does the project connect to the region of East Norrbotten?
 - d. What problem(s) are the focuses of the project? How do these problems connect to the region of East Norrbotten?
 - e. How did the project idea evolve?
 - f. With whom have you been in contact/collaborating with concerning these issues? (Very frequent contacts/frequent contacts/occasional and very occasional contacts)
 - g. Have some people been more influential than others in this process?

The Process of Prioritizing

How did you decide what action to pursue and what actions not to pursue? How did you choose between different ideas and alternative actions?

1. Describe how the agenda and steering of the project developed.
 - a. What specific problem did your project aim to solve?
 - b. How did you decide about the content of the project?
 - c. What criteria were used in this process of prioritizing? Why were other ideas and alternatives rejected?
 - d. With whom have you been in contact/collaborating concerning these issues? (Very frequent contacts/frequent contacts/occasional and very occasional contacts)
 - e. Have some people been more influential than others in this process?

The Process of Resource Mobilization

How was the process of resource mobilization carried out?

1. Describe the process of resource mobilization

- a. How did you identify what kinds of resources, in terms of individuals, knowledge, money, etc., were needed for the process?
- b. Did you (together with those already involved) possess the necessary resources?
 - Money
 - Knowledge
 - Information
 - Time
- c. What did you do in order to secure the missing resources?
- d. With whom have you been in contact/collaborating concerning these issues? (Very frequent contacts/frequent contacts/occasional and very occasional contacts)
- e. Have some people been more influential than others in this process?

B. Additional Questions for Supervisors

Name

Education

Present Position

Relation to East Norrbotten Research Station

1. Describe your initial contact with East Norrbotten Research Station.
 - a. How did you get involved in the School of Research? Why? What were the motives for you to participate in the project?
 - b. What were your attitudes toward the Research Station and its goals in a more general sense?
2. Experiences from the work.
 - a. How did the research idea of the project that you are supervising develop? Who affected/influenced/decide upon the choice of subject and content? Were representatives from the local economic life involved? Were representatives from the political/administrative sector involved? In what way does the project connect to the region of East Norrbotten?

- b. Is this project different from other Ph.D. projects? In what aspects?
- c. What are the prevailing attitudes toward this kind of project within the university—namely, basic research versus applied research?
- d. With whom have you been in contact/collaborated during this process in the political/administrative sector, economic life, and other academic actors? How would you describe this collaboration? How have you experienced the expectations raised by others regarding the role of the university in this process? What possible conflicts of interest have emerged? How have these differences been handled?
- e. What is the potential for the concept implemented in the Research Station to illustrate a model for similar projects in the future? What contributions might it make to developing activities related to the “third assignment”?

C. Additional Questions for Entrepreneurs

Name

Education

Present Position

Relation to East Norrbotten Research Station

Expectations and Experiences from Working with the Research Station

1. Have you participated in the development of East Norrbotten Research Station? If so, in what way?
 - a. What have you done and together with whom?
 - i. Have you participated in the initial work establishing the Research Station? (Problem definition, prioritizing, resource mobilization, and evaluation)
 - ii. Have you participated in the work concerning the specific research projects? (Problem definition, prioritizing, resource mobilization, and evaluation)
 - iii. Have you participated in any other way?
 - b. With whom have you been in contact/collaborated with in regards to these activities? What old/new contacts have been made?

2. Why did you become involved in the Research Station? What expectations did you have concerning your involvement? Describe your attitude toward the general concept of the Research Station?
3. Have your initial expectations been fulfilled? Does the actual result correspond to your expectations? Have your expectations changed along the way? Why or why not?
4. Has your involvement in the Research Station been beneficial to you? Why or why not? Have you learned about any scientific results, other types of knowledge, increased competence, increased knowledge about a particular area, and/or enlarged network?
5. From an entrepreneurial perspective, do the activities related to the Research Station correspond to any experienced need? Do entrepreneurs need research? Why or why not?
6. How do other entrepreneurs react when they hear about the Research Station?
7. Is the Research Station a good way of promoting entrepreneurship within the region? Is the Research Station a good model for future projects? Why or why not?

How would you describe your network?

8. How would you describe your contacts with the political/administrative sector? Has the Research Station had any effect on these contacts? Have your knowledge about and your attitude toward this sector changed as a result of the Research Station?
9. How would you describe your contacts with the universities? Have the Research Station had any effect on these contacts? Have your knowledge about and your attitude toward this sector changed as a result of the Research Station?

10. How would you describe your contacts with other entrepreneurs within the region? Has the Research Station had any effect on these contacts? Have your knowledge about and your attitude toward this sector changed as a result of the Research Station?

APPENDIX E

Case II Questionnaire

Are you a part of the network related to East Norrbotten Research Station?

East Norrbotten Research Station organizes six research projects concerning tourism, wood design, and perch and blueberry cultivation. In addition, a variety of other activities like education, workshops, and seminars are arranged within the station. These research projects and associated activities are herein referred to as “activities related to East Norrbotten Research Station.”

On the following page is a list of all the persons who have been identified as involved in these activities. Your assignment is to indicate the persons with whom you have discussed activities related to the Research Station. You are also requested to estimate the frequency of those discussions. If you have not participated in any discussions of this kind, you should leave the questionnaire blank. However it is still important that you return your answer.

How Do I Answer the Questionnaire?

- The question concern the time period from the initial idea of the Research Station until the present date.
- The question concerns activities that are *directly related* to the Research Station (i.e., the process that led to the decision to establish a Research Station, the process in which the specific areas of research were identified and implemented, and other associated activities).
- *Several discussions* are separated from *occasional discussions* since these refer to communication on a more regular basis.
- If you have had discussions with *persons not on the list*, you should add their names to the list.
- When presenting the data, each person will be represented as a node in a network; no names will be reported (see picture below).

Indicate the persons with whom you have discussed activities related to East Norrbotten Research Station. Mark the square that best describes the frequency of the discussions.

My name is: _____

Name	Occasional discussions	Several discussions
Actor A		
Actor B		
Actor C		

Name	Occasional discussions	Several discussions

Many thanks for your participation!

APPENDIX F

Case III Interview Questions

Background

1. Name
2. Age
3. Do you live within the geographical area of the Fish Management Area (FMA)? Have you immigrated into this area?
4. Have you participated in similar management processes previously? Do you have previous experiences working with non-profit associations (movements, political parties, etc.)?
5. In what way do you use the resource?
6. What kinds of expectations do you have concerning the results of your engagement in the FMA in both short- and long-term perspectives? Do you think that your future possibilities to use the resource will be affected by your involvement in the process in either the short or long term?
7. Are you representing someone other than yourself in the management process (i.e., do you represent any special organization or any special interests)?

About the Resource

8. What resource(s) are managed within the FMA? Is there a clear boundary stipulating what the scope of the management system is? Does the management system overlap any other system governing other resources or other areas?

9. Can you, within the frame of the FMA, affect the supply and quality of the resource or is the resource strongly affected by external factors beyond your control?
10. How would you describe the condition of the resource? What is the ecological state of the area? How “healthy” is the resource?
11. How do you gain knowledge about the state of the resource system (methods for measurements, systematic observations, or “just knowing” and own experiences)? Who provides this information? Do you have access to reliable information concerning the resource (quantities, health, etc.)?
12. Who has access to information regarding the state of the resource? Do all users have this information? How is the information distributed among users?
13. Is there a common view concerning the state of the resource among those participating in the management of it or do different points of view exist concerning these issues?
14. Is the resource supply fairly predictable? Do people know, on average, what catches to expect or do large variations or irregular variations exist in supply?

About the Management System

15. In regards to participation:
 - a. Are there rules stipulating who has the right to participate in the management of the FMA? What do these rules say and how do they actually work?
 - b. Are some people more influential than others? If so, who?
 - c. Do those who use the resource take part in the management of it or are there groups of users excluded from the management system?
16. What is the goal of the FMA? How has this goal been processed? Who participated in the process?

17. Is there a management plan for the FMA?
 - a. How was this plan processed?
 - b. Who participated in that process?
 - c. Is the plan known and used? Is it continuously reviewed and reversed? If not, why not?
18. Are there rules stipulating who is entitled, and who is not entitled, to fish within the FMA?
 - a. How have these rules been processed?
 - b. Are the rules clear?
 - c. What do the rules say and how do they actually work?
19. Are there rules stipulating when and how one can fish—for example, during what periods, with what equipment, and in what quantities?
 - a. What do the rules say and how do they actually work?
 - b. How have these rules been processed?
 - c. Who participated in that process?
 - d. Based on what criteria are these decisions made?
 - e. Does prevailing information regarding the state of the ecological system and the resource supply influence this process?
20. Are the appropriation rules based on the health of the resource?
 - a. Are the rules changed and adapted according to changes in the resource? Provide examples.
 - b. Elements of learning in this process of rule-formation?
21. Have the experiments (the project together with the university) influenced the formation of rules or, more generally, influenced the activities within the FMA? If so, in what way?
22. Do you think that the rules set by the FMA have affected the supply and quality of the resource?

23. Do the rules stipulate and clearly define what is to be regarded as rule-breeching behavior? Do rules exist stipulating what courses of actions are taken when someone breeches the rules? If so, what do the rules say? Do graduated sanctions exist? What do the rules say and how do they actually work?
24. How are the rules monitored? Who participates in this process? What do the rules say and how do they actually work?
25. Do you think that the rules are obeyed? Are there any differences between the formal rules and “what people actually do”? Provide examples.
26. What happens in cases when those of you participating in the process have different points of view? Provide examples. How are differences handled? Is there a certain course of action to pursue on these occasions? What do the rules say and how do they actually work?

Network

27. With whom do you, on a regular basis, discuss issues concerning the goals and routines of the FMA?
28. With whom do you, on a regular basis, discuss issues concerning the resource supply and the state of the ecological system?

About the Relation to other Actors

29. Does the legal framework regulating the FMA provide appropriate prerequisites for managing the resource in a good way? Does the FMA have access to necessary resources such as money, knowledge, and contacts in order to manage the area satisfactory?
30. What relationship does the FMA have to the County Administrative Board and other public administrative actors, including the municipality? What is the

level of mutual understanding? Have these relations changed over time? Have the experiments affected the state of these relationships?

31. What relationship does the FMA have to the universities and scientific representatives? What is the level of mutual understanding? Have these relations changed over time? Have the experiments affected the state of these relationships?
32. Are there any other important actors?

APPENDIX G

Case III Questionnaire

ARE YOU A PART OF THE NETWORK RELATED TO LYCKSELE FISH MANAGEMENT AREA?

- The questionnaire, which starts on the next page, includes two questions:

Question 1 asks who you usually talk to about the goals, rules, and routines of the FMA. The question is followed by a list of names. Your task is to mark the persons to whom you usually talk concerning these issues.

Question 2 asks to whom you usually talk concerning the ecological status (i.e., the physical condition of the fish and waters of the FMA)? The question is followed by a list of names. Your task is to indicate the persons to whom you usually talk concerning these issues.

- If you have not had any repeated contacts in discussing the ecological status or the rules and routines of the FMA, leave the questionnaire blank. However, it is still important that you return your answer!
- If persons are missing from the list, add those names to the list.

Thank you for your participation!

1. Who do you usually talk to about the *goals*, *rules*, and *routines* of the Fish Management Area? Indicate this by marking the square behind the person's name.

[illegible]

2. Who do you usually talk to about the *ecological status* (i.e., the physical condition of the fish and waters of the FMA)? Indicate this by marking the square behind the person's name.

[illegible]

