Bottom-up development of innovation theory and policy[1]

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Abstract
In recent decades, the role of policy networks in public promotion of innovation has been highlighted in Western innovation policies and innovation theories. However, a knowledge gap still prevails concerning the paradox that while emphasizing decentralization and inclusion in theory, innovation theories and policies are characterized by a top-down approach in practice, ascribing superiority to certain actors and areas in advance while marginalizing others. This motivates the application of analytical approaches and empirical data that are more considerate towards a multitude of actors, areas and aspects in order to fully understand the dynamics of policy networks such as innovation systems and clusters. In this article, some of the marginalized actors and areas get to prove their importance empirically by means of existing tools of bottom-up policy analysis. A bottom-up approach has previously been applied in relation to innovation systems and clusters only in a few research studies. The paper portrays how four Swedish policy networks have challenged prevailing innovation policy and innovation research by highlighting the role of non-profit actors, services and creative industries and women's entrepreneurship and innovation. They have challenged the norms by expanding the range of relevant actors in such policy networks, resulting in entrepreneurial types of innovation systems. The bottom-up generated data contributes to the further development of existing innovation theories by exposing a causal relation between context, organization and outcomes – implying that experiences of marginalization evoke entrepreneurial types of innovation systems rather that institutional, engendering a wider range of innovations. The acknowledgement of such a causal relation increases the ability of innovation theories to correctly inform Western policies aiming to enhance innovation and evoke "smart, sustainable and inclusive growth", emphasized in the new EU2020 strategy.

Keywords Innovation policy, Innovation theory, Policy networks, Innovation systems, Bottom-up, Top-down

Introduction

In recent decades, researchers and policy makers have paid growing attention to innovation and its assumed significance for economic growth. Specifically, the role of policy networks has been highlighted as enhancers of innovation. This has spurred the development of national and regional innovation policies promoting innovation systems, clusters and Triple Helix

constellations, which are three types of policy networks believed to enhance innovation. Innovation theories – highlighting the relations and results of policy networks as decentralized policy development and implementation – have also been engendered. However, some knowledge gaps still prevail in present innovation theories and policies. One such gap derives from the paradox that while emphasizing decentralization and inclusion in theory, innovation theories and policies are still characterized by a top-down approach in practice by ascribing superiority to certain actors and areas while marginalizing others. This motivates the application of analytical approaches and empirical data that are more considerate towards a multitude of actors, areas and aspects in order to fully understand the dynamics of innovation.

Existing policy analysis provides tools that are suitable for such an endeavor, such as non-hierarchical implementation analysis and implementation structures. In this article these tools of bottom-up analysis will be employed to analyze a new type of empirical data, engendering conclusions that spur further development of prevalent innovation theories and policies. The policies and theories will be scrutinized on two levels. Firstly, on the level of organizational character, where it will be explored to what extent this is affected by the specific context. Secondly, on the level of outcomes, where it will be explored to what extent this is affected by the organizational character. The analysis thus aims to reveal of there is a causal relation between context, organization and outcomes in regard to policy networks promoting innovation. In order to achieve this, four hypotheses will be empirically tested. These hypotheses state: 1) that policy networks emerge and are shaped differently in different contexts, 2) that policy networks emerge and are shaped differently depending on the definition of the policy problem to be solved, 3) that the specific organizational features of a policy area affect what outcomes that are evoked in terms of resource allocation, scope of participation, new products and services, and 4) that the specific organizational features of a policy network affect what outcomes that are evoked.

The new type of empirical data presented in this article derives from a R&D project conducted in Sweden 2005-2008. In the project, prevalent innovation policy and research were related to efforts to promote women's entrepreneurship and innovation by four regional policy networks in Sweden. These networks had problematized the use of innovation systems, clusters and Triple Helix as policy tools and theoretical concepts themselves, even before the project was initiated. Their problematization was motivated by the pattern of inclusion and exclusion in prevalent innovation policy and research in Sweden, prioritizing a surprisingly homogenous group of actors and areas on questionable grounds. They thus serve to illustrate the tension between innovation policy and theories formulated top-down, recognizing a limited scope of actors and areas, and activities undertaken bottom-up, acknowledging the plausible importance of a broader scope of actors and areas. This tension between bottom-up and top-down approaches in theory and policy is here employed for deepening the understanding of how policy network can engender innovation and for suggesting further development of prevalent innovation theories and policies. The "newness" in this type of data is that it represents actors and areas that have not yet been acknowledged in prevalent innovation theories to any great extent, but who nevertheless possess a potential to contribute to theoretical development.

The article commences with an account of the research design of the study. This is followed by a recite of different tools for bottom-up policy analysis such as non-hierarchical implementation analysis and implementation structures. Thereafter, prevalent innovation theories and policies are described. The empirical data is then presented concerning how the four regional policy networks in Sweden have enhanced innovation in a way that challenges

prevalent innovation theories and policies. This is accompanied by an analysis of how the tools of non-hierarchical implementation analysis and implementation structures can be employed for enlightening the relations and results of these four policy networks in particular, and policy networks in general. The ensuing conclusion addresses the four hypotheses, revealing whether a causal relation prevails between context, organization and outcomes. Finally, a discussion is pursued concerning the need for further development of innovation theory and policy spurred by the analysis of a new set of empirical data in the light of other tools for policy analysis.

Research design

The empirical data presented in this article emanates from a R&D project conducted by Luleå University of Technology and Mälardalen University, Sweden, during 2005-2008. The project was financed by the Swedish innovation agency VINNOVA (www.vinnova.se) and European Regional Development Fund (http://ec.europa.eu/regional_policy/funds/prord/prord_en.htm). Four researchers and four regional policy networks took part in the project, which aimed to create a common platform of knowledge concerning how innovation can be enhanced by policy networks. The four policy networks included representatives from public, private, academic and non-profit organizations. They were all specialized on promoting women's entrepreneurship and innovation, mainly supported by public funding, mainly from the Swedish Agency for Economic and Regional Growth (Tillväxtverket/Nutek). The four researchers – the author of this article being one of them – represented three different research fields: engineering, political science and entrepreneurship research.

The project was conducted by means of a participatory research approach, implying that the knowledge was developed jointly by researchers and network members. Participatory research (also known as action research) has a long tradition within pedagogic sciences and work life sciences (Aagaard Nielsen & Svensson 2006). Within this stream of research, two different traditions have emerged: one emphasizing a pragmatic approach to participatory research and the other promoting a more critical approach (Aagaard Nielsen & Steen Nielsen 2006, Johansson & Lindhult 2008). The first mentioned tradition focuses dialogue within a group, stressing the importance of organizational learning and consensus. The last mentioned tradition highlights how the dialogue between participants and researchers enhances a critical reorientation of existing norms and practices. This tradition can thus initiate social change in a broader sense than the pragmatic tradition. The research process described here adheres primarily to the critical tradition of participatory research, examining prevailing norms in innovation policy and innovation research. This examination took place in so called dialogue seminars, arranged as a part of the R&D project. At the dialogue seminars, participants from the four policy networks were encouraged to discuss their activities in the light of predominant policy and analytical tools for enhancing and understanding innovation by means of policy networks. Dialogue seminars are part of a methodological tradition within Nordic work life science since the 1980's, striving to make the voices of all parties concerned heard in the R&D process (cf. Shotter & Gustavsen 1999, Bjerlöv & Garibaldo 2006).

The discussions taking place at the dialogue seminars were recorded and transcribed. These transcriptions constitute one part of the empirical data presented in this article. Thereto, the empirical data is composed of the participants' drawings made during the seminars and photographs of the researchers' white board notes. Existing reports and websites of the policy networks have also been considered. Policy documents describing innovation policy tools and strategies constitute an additional part of the empirical data, comprising the Swedish national innovation strategy, the Visanu program managed by the public authorities NUTEK,

VINNOVA and ISA 2002-2005, NUTEK's regional cluster programs executed 2005-2010, VINNOVA's priorities 2003-2007 and VINNOVA's Vinnväxt program 2001-2005. The empirical data is here analyzed by means of bottom-up policy analysis tools, engendering conclusions that spur further development of pivotal parts of contemporary innovation theories and policies.

Bottom-up perspectives in policy studies

As noted above, there is a knowledge gap in present innovation theories and policies deriving from the paradox that while emphasizing decentralization and inclusion in theory, innovation theories and policies are still characterized by a top-down approach in practice. This is since they ascribe superiority to certain actors and areas while marginalizing others, based on assessments made beforehand. This motivates the application of analytical approaches that are more considerate towards a multitude of actors, areas and aspects in order to fully understand the dynamics of innovation. Existing policy analysis does provide tools that are suitable for such an endeavor, such as non-hierarchical implementation analysis and implementation structures. In this section, these tools for bottom-up policy analysis will be described more in detail. Later, these tools will be implemented on a new type of empirical data, engendering conclusions that spur further development of prevalent innovation theories and policies.

Since one aim of this article is to identify and portray a wider range of actors and activities than in the prevalent innovation policy and research, the analytical tools presented here have in common that they make it possible to study the organization of policy networks and the governance of innovation policy without determining in advance which actors and areas are of relevance. These analytical tools described all belong to the group of bottom-up approaches which are characterized by their ability to illustrate how a particular policy area can be portrayed from the stakeholders' point of view, gazing from the grass roots level. In this section, the bottom-up approach will be contrasted to a top-down approach, where relevant actors and sectors are designated in advance, before any empirical studies have been carried out. Such an analytical procedure primarily depicts how a particular policy is regarded by public actors at the national – and to some extent the regional – level.

The approaches of bottom-up and top-down have been used as analytical approaches in political science research for several decades (cf. Lipsky 1978, Hjern 1982, Sabatier 1986, Matland 1995, Carlsson 1996, 2000a, 2000b). Originally, these approaches were used to study how policies are implemented and what factors may explain the success or failure of policy implementation (Sabatier 1986, Carlsson 1996). As bottom-up and top-down were developed further as analytical tools and theoretical concepts, increased attention was paid to a wide range of policy activities and aspects, however, not only to the ones strictly related to governmental implementation (Matland 1995). By applying a bottom-up approach on a relatively new area of policy actions and theoretical development – that is, the promotion and study of policy networks promoting innovation – this article maintains and expands this tradition of political science. A bottom-up approach has previously been applied in relation to innovation systems and clusters only in a few research studies (cf. Goldfarb & Henrekson 2003, Fromhold Eisebith & Eisebith 2005).

The term policy can be defined as a set of ideas and the institutional arrangements initiated to realize these ideas (Carlsson 2000a). The term thus embraces both written policy programs and practical policy measures. Sometimes, policy is regarded to be a concern only to politicians and officials, where political activity is assumed to be exercised by the government exclusively (Premfors 1989). This perspective is coherent with a top-down approach to policy

analysis. A contrasting vision has been offered, though, claiming that it is not always so that the conversion of political ideas into practice is consistent with the intentions conveyed in public policy programs. Instead, several activities might be carried out in relation to a specific policy area without being orchestrated by the government. These activities might imply other issues, decisions and practices than those promoted in the policy programs. This perspective is coherent with a bottom-up approach to policy analysis. It is then the policy problem – not the policy program – that is regarded to be the organizing force in a specific policy area. The term policy problem has been defined as a publicly expressed disapproval by any societal actor, followed by demands that the problem should be solved by political action (Carlsson 2000a). The disapproval and political action does not necessarily have to be articulated or carried out by public policy institutions. Instead, it can imply interplay of several individuals and organizations, adhering to many different sectors of society. The term problem is then "used in a broad sense, also signifying concepts like needs, challenges and strains" (Carlsson 1996, p. 540). Efforts to promote women's entrepreneurship and innovation – which are highlighted in the empirical case of this article – could thus be considered to constitute a part of innovation policy in the sense that a policy problem has been identified, requiring political action in order to be solved. The policy problem that has been identified is the one-sided priority pattern in innovation policies and innovation theories, ascribing importance only to a few, centrally distinguished, actors and areas while marginalizing others. The suggested solution is to identify a broader range of actors and areas contributing to innovation and growth. This is suggested to take place in a dialogue between several different societal actors representing the public, private, academic and the non-profit sector (cf. Lindberg 2010).

The above discussion indicates that there are two alternative analytical approaches when studying policies and policy making. Policies can either be studied with a hierarchical approach, which here is labelled a top-down approach since it focuses the importance of the government and its policy programs. Policies can alternatively be studied with a non-hierarchical approach. This approach is here labelled a bottom-up approach, because it acknowledges the importance of a wide range of actors outside governmental institutions. The main difference between these two approaches is that while the hierarchical approach emphasizes the power of the government and public authorities to determine policy activities by means of political-administrative control through policy programs, the non-hierarchical approach draws attention to how a wide range of actors might be influential e.g. concerning the promotion of innovation by policy networks (Sannerstedt 2001). The non-hierarchical approach does not preclude, however, that the researcher may find out that some actors play a more important role than others when the empirical study is carried out. But each actor's relevance is then proven empirically, not assumed in advance (Carlsson 1996). A non-hierarchical approach might thus help to depict both those actors who have been ascribed importance in prevalent innovation policies and innovation theories and those actors who have been ascribed a minor role – but who nevertheless may prove to be of importance to the promotion of innovation by policy networks. The relationship between bottom-up policy analysis and policy making authorities has been described in the following manner by Carlsson (ibid, p. 532):

> "…omitting the presupposed existence of formal political hierarchy as the point of departure for the analysis gives the analyst the opportunity to detect under what circumstances hierarchy is prevailing. This is a thrilling and urgent task for implementation research."

The hierarchical approach puts the political-administrative institutions at the centre of attention on a macro-level (cf. Giddens 1981). This serves as a basis for an assessment of whether the implemented measures are consistent with the public intentions (Sabatier 1986). Empirical studies undertaken with a hierarchical approach exposes that the effective implementation of policies requires certain conditions, e.g. that the decisions are clear and consistent, that the implementing agents are skilled and committed, and that the original decision is supported by various societal interest groups (Matland 1995). A non-hierarchical approach implies that policies are studied from the perspective of different societal groups and service providers. The relevance of the political decision is then esteemed in terms of the reactions of e.g. non-profit organizations and the solutions they advocate (Sabatier 1986). Thus are the individual actors at the centre on a micro level in the non-hierarchical approach (cf. Giddens 1981). The interplay of the hierarchical and the non-hierarchical approach cast a light on the current situation in innovation policy and research. Many research studies and policy programs one-sidedly focus those policy networks identified in existing policy programs. This can be interpreted as an expression of a hierarchical approach, taking its starting point in centrally defined estimations of innovative potential. Far fewer studies and programs reach beyond this demarcation and acknowledge the importance of policy networks initiated by a multitude of societal actors. Such a proceeding corresponds to a non-hierarchical approach in that it does not exclude certain actors on beforehand.

Bottom-up policy studies can base its procedures on what has been called implementation structures (Hjern & Porter 1983, Hjern & Porter 1997). An implementation structure consists of a set of actors who have formed a common platform for cooperation in order to solve a jointly perceived policy problem. This is a common phenomenon in the implementation of policy programs, which in practice seldom are implemented solely by the state, but instead by a variety of organizations. Implementation structures are formed as a result of the participants' own formulation of a policy problem as they understand it. Thereby, they enable policy problems to be handled on the participants' own terms, rather than on the terms set by formal policy decisions. Implementation structures exercise functions such as goal setting, planning, resource allocation, services and evaluation (Premfors 1989, Hjern & Porter 1997). Theoretically, implementation structures have been used as an approach to increase the understanding of how policy programs are converted from text documents to practical action. Policy-wise, implementation structures can be used as a political-administrative instrument to organize the implementation of policy programs. However, these structures are more often self-organized by the involved actors themselves than designed after existing, hierarchical relationships (Hjern & Porter 1997). Implementation structures are similar to policy networks, in that they constitute platforms for joint action with actors from different societal spheres. Here, implementation structures will be used as an analytical tool for studying the practical organization of policy networks promoting innovations and the conversion of innovation policy programs to political action.

When using implementation structures as an analytical tool in bottom-up policy studies, the scope of important actors is an empirical question. One common method used to map which actors are involved in a particular policy network is to base the identification on the participants' own perception of who is involved (Carlsson 2000b). In this way, bottom-up studies imply an extensive search for appropriate units of analysis, rather than take these for granted as in a top-down approach. Two basic questions guide the mapping of implementation structures: What is the problem to be solved? and Who participates in the solution of the problem?. The first question makes it possible to detect policy problems that may not be mentioned in policy programs, but that nevertheless are perceived as policy problems by some

groups of people. The second question enables an estimation of whether political authorities contribute to the process of problem-solving or not. In addition, questions may also be posed concerning how the various actors are involved, with what specific strategies and with what purposes. After finding out the answers to this set of questions, the researcher is free to choose any suitable scientific theory in order to deepen the understanding of the policy processes being studied.

The implementation structure approach is thereby mainly an analytical concept without all-embracing theoretical aspirations, simply being a tool for identifying and describing ongoing policy processes. According to Carlsson (1996), it is quite possible to construct theories concerning how governance and policy networks are used as steering methods in modern policies. But a coherent implementation theory is still far from being realized. Some causal relations have been suggested in non-hierarchical implementation analysis, providing incentives to construct a more comprehensive theory (Carlsson 2000). These relations address two different levels: the character of policy networks and the outcomes of such networks. Concerning the character of policy networks, it has been proposed that the specific context of each policy network affects its organizational features. Regarding the outcomes of policy networks, it has been suggested that the organizational features, in turn, affect the results. Carlsson (ibid, p. 507) has described this latter relation by stating that "the creation of politics and its outcome will differ, depending on how a policy area is organized". Different types of policy networks will, according to the proposed causal connection, evoke different types of results. Regarding policy networks promoting innovation, some of them might thus produce new knowledge and innovations that differ from the others. The two causal relations being proposed imply that the character of policy networks can be analyzed in two different positions: either as dependent variable – the context affecting the character – or as independent variable – the character affecting the outcomes. This is described by Carlsson (ibid, p. 502):

> "…A great thrill for the policy sciences would be to a greater extent treat networks as independent rather than as dependent variables, i.e. not only to describe the features and structure of networks but also to demonstrate to what extent they have some explanatory power. This, it is argued, would significantly advance the frontier of policy analysis."

Such a twofold analysis – treating policy networks both as independent and dependent variables – can be enhanced by the formulation of specific hypotheses to be empirically tested (ibid). Concerning policy networks as dependent variable, two hypotheses have been formulated: 1) that policy networks emerge and are shaped differently in different contexts, and 2) that policy networks emerge and are shaped differently depending on the definition of the policy problem to be solved. Regarding policy networks as independent variable, another two hypotheses have been formulated: 3) that the specific organizational features of a policy area affect what outcomes that are evoked in terms of resource allocation, scope of participation, new products and services 4) that the specific organizational features of a policy network affect what outcomes that are evoked. The causal relation between these hypotheses is illustrated in *Figure 1*.

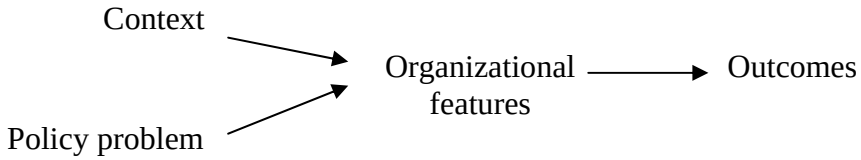

Figure 1. The causal relation of context, organization and outcomes

In this article, the chain of hypotheses will be tested against the new type of empirical data introduced earlier. Thereby, it will be revealed to what extent the suggested causal relation is true regarding the four regional policy networks, especially concerning their specific organizational features and their variety in outcomes. Before that, the definition and use of policy networks in innovation policy and theory will be discussed in the upcoming section.

Innovation theory and policy

In this section, prevalent innovation theories and innovation policies are described, concerning the definition and use of policy networks. The account will address the two different levels of policy analysis presented in the previous section: the character of policy networks and the outcomes of such networks. This division will enhance the analysis of whether the specific context of a policy network affects its organizational features and whether the organizational features, in turn, affect the results.

Politicians, civil servants and scientists – primarily in the Western world – have during the recent decades paid increasing attention to the role of policy networks in the emergence of innovations. Specifically, the importance of policy networks with participants from different sectors of society has been stressed. Policy networks such as innovation systems, clusters and Triple Helix are believed to contribute to the development of new, relevant knowledge that is transformed into innovations, contributing to economic growth (Danilda & Granat Thorslund 2011). National and regional authorities in Sweden and several other Western countries have allocated public funding to initiation and development of these types of policy networks. Critiques have been articulated towards the public promotion of innovation systems and clusters, however, in that it ascribes superiority to certain actors and areas while marginalizing others (cf. Lindberg 2010). In particular, women and services industries have been disadvantaged. This marginalization occurs despite the fact that several of these industries have been attributed a central role in the transformation of Western economies to become more dynamic and knowledge-based (Marklund et al 2004). Neither policy makers nor researchers have analyzed how policy networks promote innovation within women dominated settings or within services industries, which are employing most women in Sweden. This article strives to address this knowledge gap by depicting some Swedish efforts to organize policy networks bottom-up, based on women's entrepreneurship and innovation, discerning the effects of this extended scope of empirical data on the assumptions made in prevalent innovation theories and innovation policies. Before that endeavor is undertaken, prevalent innovation theories and innovation policies will be depicted in this section.

The term innovation is here defined as new or improved products, processes or services with community benefits. Innovation research has generally focused upon technological product innovations, though, ignoring non-technological and intangible innovations, such as service

innovations and organizational innovations (Edquist 2005). Innovation systems, clusters and Triple Helix are treated as three different types of policy networks, enhancing innovation by cooperation between actors from different industries and sectors of society. The term innovation system specifically refers to policy networks where actors from different societal spheres join forces to develop new knowledge and innovations. The term cluster refers to geographical assemblages of companies active within the same business area, exchanging knowledge, information and personnel. The term Triple Helix refers to policy networks where public, private and academic actors jointly promote knowledge development and innovation (Nuur 2005, Lavén 2008). The encompassing term policy network is here defined as a platform for joint action with participants from different spheres of the society. Participants can be either individuals or organizations. A policy network is thus defined by the actors it embraces, their linkages and its boundaries. These networks are voluntary constellations of participants who are mutually dependent. Horizontal structures are a main feature, implying that the participants are self-governing. The term network can be contrasted with the term organization, which refers to constellations that are more formally structured by statutes and regulated membership (cf. Jacobsen & Thorsvik 1998, Carlsson 2000b). In this article, the term policy network specifically refers to constellations of actors promoting innovation through the joint development of new, relevant knowledge. The definition of policy network is thus broad enough to encompass clusters, innovation systems and Triple Helix constellations. In regard to the two levels of analysis employed in this article, organizational character and outcomes, these definitions of various types of policy networks reveal both which organizational features and which outcomes that are regarded to be pivotal in prevalent innovation theories.

The terms clusters, innovation systems and Triple Helix reflect the fact that innovation increasingly has come to be regarded as dependent on a system of institutional and cultural aspects. Innovation is thus assumed to be enhanced by certain types of networks that are supported by laws, rules, standards, etc. (Fagerberg et al 2005). The use of a system approach to innovation in research and policy has aimed to highlight how the interaction between actors from different sectors of society affects how innovations arise. Prevalent innovation theories thereby highlight innovations as an expected outcome of policy networks. In research, this system approach to innovation was launched across a broad front at the end of the 1980's and early 1990's (Granat Thorslund et al 2006, Eklund 2007, Lavén 2008). Freeman's (1987) analysis of the Japanese economy has been identified as one of the first research studies in which innovation system was used as a theoretical concept. Freeman had mentioned the concept even earlier, though, in an unpublished report written for OECD in 1982. Lundvall was also an early adopter when he mentioned the term innovation system in a research report from 1985. Edquist was yet another early adopter of the concept (Eklund 2007, Lavén 2008). The main ideas permeating these studies were all based, however, on the works of List (1841/1885), who was the first researcher to highlight national systems of production and learning, even if he did not use the term innovation system. Triple Helix was launched as a term in mid-90's by Leydesdorff & Etzkowitz (1996) in order to illustrate how government, industry and academia collaborated in the promotion of innovations (Lavén 2008). As for cluster as a theoretical concept, Porter (1990) has been identified as one of the first researchers to use it (Nuur 2005, Granat Thorslund et al 2006, Eklund, 2007, Lavén 2008).

Both innovation policies and innovation theories have been characterized by a top-down approach, in that they – by gazing down from a superior position – have identified only a limited scope of actors, areas and types of innovations as relevant to the innovation promotion pursued by policy networks. In contrast, this article considers that a bottom-up approach could

highlight the importance of a broader spectrum of actors, areas and innovations taking its starting point in initiatives taken at grass roots level. This article thus extends the arena for knowledge development regarding policy networks by depicting some of the actors, areas and innovations currently marginalized in innovation policy and innovation research. This procedure questions existing norms and suggest modified ways of identifying and promoting innovation by public support to policy networks. One of the aims in this study is to depict actors, areas and innovations that have been down-prioritized in policy and research. The analytical approaches employed in the study make it possible to study the organization of policy networks and the implementation of innovation policy from a bottom-up perspective. As an analytical approach, bottom-up implies that policies are studied on the basis of how people at the grassroots level identify certain policy problems and try to find solutions to these (Sabatier 1986). This means that individual actors are the focus of attention (cf. Giddens 1981). This approach does not distinguish crucial actors and relevant areas in advance. Instead, the relevance of different actors and areas is established through empirical studies.

The down-prioritized areas and actors would not be as apparent if those parts of existing theories were used that draw attention only to the importance of a few – centrally identified – actors and areas, as is the case in the top-down approach. Since this article sets out to portray actors and activities being down-prioritized in policy and research, it will highlight those parts of prevalent innovation theories that make it possible to study the organization of policy networks and governance of innovation policy from a bottom-up perspective. The down-prioritized stakeholders and areas would not be as visible if those parts of the theories were used that only recognize the importance of a few, centrally identified, stakeholders and sectors, as is the case in a top-down approach. As an analytical approach, the top-down perspective implies that policies are studied from the policy makers' point of view and their intentions as they are reflected in laws and policy programs (Sannerstedt 2001). This means that the political-administrative institutions are the focus of attention (cf. Giddens 1981).

The tools for bottom-up policy analysis presented in the previous section – the non-hierarchical approach and implementation structures – may be enriched by existing theories of how innovation systems are organized. Innovation systems can be portrayed as consisting of two parts: components and relationships. The components correspond to the different organizations and institutions that the actors involved in the system represent. The relationships acknowledge how these components interact with each other. They compete, exchange goods and services, and share knowledge within their policy network (Edquist 2005). By combining theories of innovation systems – which highlight how actors cooperate in order to develop innovations – with a bottom-up approach – not taking any actor's involvement for granted – it is possible to study policy networks promoting innovation in a way that differs from the usual approach of innovation policy and innovation research. A bottom-up approach may thus broaden the spectrum of relevant actors and activities in policy studies of innovation system. The character of policy networks might thereby be described differently in traditional innovation theories compared to innovation theories enriched by a bottom-up perspective.

Triple Helix is one of the central concepts in innovation research employed to study how policy networks promoting innovation are organized and might be classified. It is thus an example of how the character of policy networks is defined in prevalent innovation theories. Triple Helix is thereto employed as a policy tool to promote innovation. Business, government and academia are the three parties distinguished in this model as pivotal is such policy networks (Lavén 2008). Leydesdorff & Etzkowitz (1996) developed this concept in

order to challenge the tendency of researchers to only focus the relationship between the business and university sectors. Instead of ascribing the public sector a minor role, the Triple Helix concept highlighted the government's potential to enhance innovation in cooperation with businesses and universities. From a bottom-up perspective, even this expansion could be regarded as an unnecessary limitation, however. This is since the concept of Triple Helix still – beforehand, from a superior position – assumes that certain actors are more relevant than others, even if the importance of other actors is yet to be proved empirically. Actors who do not belong to business, government or academia may nevertheless have an influence on the promotion of innovation in policy networks. By ascribing superiority to certain actors and areas while marginalizing others, Triple Helix is consistent with a top-down perspective as analytical approach and policy tool.

In policy, innovation systems are often equated with Triple Helix, which is a generalization that does not correspond to the distinction made in innovation theories. There, the term innovation system refers solely to policy networks promoting innovation by unifying actors from different societal sectors, while the term Triple Helix refers to the unification of three particular sectors. Lavén (2008) suggests that the equation makes Triple Helix a government-sanctioned norm for policy networks promoting innovation. Shinn (2002) notices a similar generalization in recent innovation research. A literature review reveals that innovation system studies have been strongly empirically based, not prescribing which actors are the most important as the Triple Helix does. This has led to the acknowledgement of a wide variety in the practical organization of innovation systems. This empirical focus is more consistent with a bottom-up type of analytical approach, not establishing the importance of different actors before the study is carried out. However, this empirical diversity has generally not evoked any suggestions to replace the Triple Helix model as the dominant model in innovation theories.

Innovation researchers have classified innovation systems by other categories as well, besides Triple Helix. Cooke et al (2004) have developed a classification of innovation systems which distinguishes between Institutional Regional Innovation Systems (IRIS) and Entrepreneurial Regional Innovation Systems (ERIS). According to these authors, IRIS is based on public knowledge production and public organizations for knowledge transfer, e.g. incubators, laboratories, mentors and other intermediaries. Ylinenpää (2008) describes IRIS as founded on engineering skills where planning is done far in advance and on a long term perspective and where the main actors are established organizations from different sectors of society. ERIS, however, is characterized by Ylinenpää as lacking established networks and resources. Individual actors – such as entrepreneurs, venture capitalists and incubators – are linked to each other when the need arises. The ERIS type of innovation systems is developed without long-term planning and is rather constructed from scratch in an ad-hoc manner. A parallel can be drawn between IRIS and a top-down approach in that they both are based on interaction within already established structures, where the importance of certain actors are taken for granted. Similarly, there is a parallel between ERIS and a bottom-up approach, in that cooperation is built up ad hoc, when needed, based on a broader scope of actors proving their importance in practice. There are also similarities with implementation structures in that both are self-organized by the involved actors themselves rather than designed after existing, hierarchical relationships (cf. Hjern & Porter 1997). The IRIS/ERIS classification of innovation systems hence corresponds to the level of policy analysis focusing the character of policy networks. However, it also indirectly addresses a second level of policy analysis, i.e. the outcomes of policy networks. This is evident when comparing the difference between IRIS and ERIS with the discovery made by Nyberg (2009), that the nature and results of

innovation processes differ depending on whether the inventors are situated within large organizations, or if they realize their inventions on their own. In large organizations, there are existing networks, structures and resources available when it comes to designing and marketing an innovation, while the individual inventors must build their own networks and mobilize resources on their own. These differences determine what types of innovations that are being developed. The innovations realized by the lone inventors are often characterized as simpler, less technological and more problem orientated than the ones developed by inventors in large organizations.

All EU member states are prescribed to follow the goals adopted by the union in Lisbon, 2000, stating that EU shall be the world leading knowledge economy by 2010. The very existence of policies encouraging innovation thus emanates from the understanding that development and dissemination of innovations will transform the economy to become more dynamic and knowledge-based. One of the tools that the EU member countries have pledged to use in order to encourage innovation is innovation systems. In Sweden, public funds are allocated to innovation systems, clusters and Triple Helix constellations by public authorities at the national level (e.g. the Swedish innovation agency VINNOVA and the Swedish Agency for Economic and Regional Growth) and regional level (e.g. County administrative boards, County councils and Regional development councils). This is implemented within the framework of programs and announcements, for example the Vinnväxt program, the regional cluster program and regional growth programs, in which candidates compete for grants. A recent survey exposes that a few – centrally identified – actors and areas have benefited from Sweden's public efforts to promote innovation via policy networks. The areas enjoying public support could primarily be derived to three groups of industries: basic industries, manufacturing industries and industries based on new technologies such as ICT and biotech. A fourth group of industries adhered to the ones enjoying the least support: Services and creative industries (Lindberg 2010).

This pattern of priority among different industries also implied that certain actors benefited more than others, due to the segregated labor market in Sweden. Despite the fact that women are active on the Swedish labor market in the same extent as men, the gender segregation is still considerate since women and men work in different sectors, industries, professions and positions. Comparing the data about the gender-segregated labor market with the priority pattern in Sweden's innovation policy it is revealed that almost all of the men-dominated sectors and industries are among the industry groups given a high priority in the Swedish innovation policy programs, namely basic and manufacturing industries as well as industries based on new technologies. And almost all of the women-dominated areas belong to the group of industries being down-prioritized in the innovation policy, namely services and creative industries. The only exception is biomedicine that may just as well be linked to the group of new technologies. Even those industries that are "gender-balanced" – in the sense that their workforce encompasses at least 40 percent of either gender – belong primarily to the low priority group of services and creative industries, with the exception of the textile industry which is a female-dominated industry that might be classified as a manufacturing industry. From this comparison, it can be noted that the great majority of the innovation systems and clusters being prioritized in Sweden's innovation policy programs is based on areas mainly employing men as employees or entrepreneurs (Lindberg 2010).

The connection between gender and innovation reveals that the actors and areas being promoted in Swedish innovation policy programs represent a narrow scope, primarily encompassing men, industries employing mostly men and industries within manufacturing,

natural resources and high-tech. This narrow scope corresponds to a top-down approach where only a few – centrally distinguished – policy networks are ascribed an important role in promoting innovation. Since much of the research on innovation systems, clusters and Triple Helix formations in Sweden has been carried out in cooperation with the formations receiving public funding from innovation policy programs, the theoretical knowledge primarily builds on empirical data from the prioritized formations. The fact that the actors and areas being down-prioritized in the innovation policy rarely have been studied in innovation research implies that the conclusions drawn about the character and processes of innovation systems might be incomplete. In the upcoming section, a new type of empirical data is presented in order to widen the arena for knowledge production on this area and ultimately to suggest further development of prevalent innovation theories and innovation policies.

Empirical data

In this section, the empirical data is presented concerning how four regional policy networks in Sweden have induced innovation in ways that spur further development of prevalent innovation theories and policies. The recite will focus the two levels identified as crucial for developing more comprehensive theories concerning how governance and policy networks are used as steering methods in modern innovation policies. These two levels are the character of policy networks and the outcomes of these networks. Especially, the influence of different contexts and policy problem definitions on the organization of policy networks will be highlighted, besides the influence of network and policy organization on the results. The empirical data includes efforts to promote women's entrepreneurship and innovation pursued by four regional policy networks in Sweden. These are: SAGA and Emma Resource Centre situated in northern Sweden, as well as Företagsamma Kvinnor (Entrepreneurial Women) and Lika Villkor (Equal Conditions) situated in central Sweden. These networks had problematized the use of innovation systems and clusters as theoretical concepts and policy tools before this empirical study was initiated. Selecting these same networks as empirical data is thus fruitful in order to illustrate and challenge prevalent innovation policies and research.

SAGA (acronym for Sámi Network Connectivity Gender Allocation) was formed in the beginning of the 21st century order to ensure women's involvement in and benefit from the project Sámi Network Connectivity (SNC). SNC was intended to develop a new system for Internet access in remote areas lacking such digital infrastructure, and the SAGA network met regularly to discuss the prospects and implications of this endeavor. SAGA's participants represented different sectors of society in Sweden's northernmost county, Norrbotten, in that they were business owners, civil servants, researchers, employees at Women Resource Centres (WRCs), or active within non-profit organizations focusing rural development. The network was partly financed by the EU Structural Funds and the Swedish agency VINNOVA. Emma Resource Centre (hereinafter called Emma RC) was established in 1993 in the western parts of the county of Västerbotten in northern Sweden. It constituted a non-profit organization and a local WRC, until its dissolution in 2010. Emma RC actively engaged in assisting women to realize their ideas of new ventures, innovations, projects and activities. They established networks among women entrepreneurs in tourism, handicraft and culture. Several of the board members were active as entrepreneurs or politicians at the municipal level. Emma RC conducted its activities with funding from the Swedish Agency for Economic and Regional Growth, the municipality and the EU Structural Funds. Entrepreneurial Women is a non-profit organization situated in the middle parts of Sweden, in the county of Västmanland. It constitutes a regional platform for the county's WRCs. Promoting women's entrepreneurship through mutual inspiration is the main purpose, and the

activities are managed exclusively by women business owners. Entrepreneurial Women is financed by membership fees as well as by the Swedish Agency for Economic and Regional Growth, the county administration and the European Union Social Fund. Equal Conditions was active during the period 2003-2007 as a national pilot project managed by the county administration of Södermanland in the middle parts of Sweden. It constituted a regional platform for the county's WRCs. The aim was to develop methods able to highlight and realize women's entrepreneurial and innovative ideas. Equal Conditions was financed by the Swedish Agency for Economic and Regional Growth and the county administration.

What unites the four networks is they all have drawn attention to an area hitherto marginalized in innovation policy and innovation research, namely women's entrepreneurship and innovation (cf. Lindberg 2010). They thus shared the ambition to promote women's entrepreneurship and innovation in their activities. In addition to this common goal, SAGA specifically wanted to promote technological development within ICT. They thereto shared the vision of inducing local and regional development with Emma RC. Entrepreneurial Women especially underlined the need for increasing entrepreneurial women's ability to support themselves economically, while Equal Conditions stressed the importance of increasing the impact of WRCs on regional development policies. These ambitions were motivated by the perception that women's contribution to regional development had been ignored and that the conditions for running businesses were unequal for women and men. The network members had experienced that entrepreneurial men and areas employing many men were prioritized in regional and national policy programs and research studies at the expense of entrepreneurial women and services industries. This marginalization occurred despite the fact that several of these industries had been attributed a central role in the transformation of Western economies to become more dynamic and knowledge-based (cf. Marklund et al 2004).

The four networks' organizational ways of realizing their common visions varied, though, spanning from SAGA gathering women with technological interest to Emma RC involving women active as politicians or entrepreneurs, Entrepreneurial Women engaging women running their own businesses and Equal Conditions employing women business counselors. All four networks had some connection to Women Resource Centre. Some of the participants in SAGA had experiences of running their own WRCs at municipal level and Emma RC constituted a local WRC themselves. Both Entrepreneurial Women and Equal Conditions were regional platforms for the county's local WRCs. This junction between the four networks and WRCs might be explained by their joint focus on women's contribution to regional development. In the early 1990s public funds were initiated to encourage the establishment of WRCs in Sweden. The ambition was to increase women's participation in regional development policy development and implementation. In 2005 there were approximately 150 WRCs in Sweden at municipal, county and national level. Gradually, the WRC model has been adopted internationally supported by various European Union funds. In 2006 Winnet Europe was formed as a non-profit organization, gathering WRCs from 21 countries. The public funding to WRCs in Sweden is nowadays distributed by the Swedish Agency for Economic and Regional Growth. The Swedish WRCs operate with a double strategy of support and counselling to women wanting to realize their business ideas and strategic actions intended to integrate a gender perspective in regional policy programs (Lindberg 2010, Lindberg 2011).

The activities being pursued in order to attain their objectives, involved the deliberate organization of networks, clusters and innovation systems among women entrepreneurs, primarily in services and creative industries, which are areas employing many women in

Sweden. The network members also participated in public seminars concerning the development and implementation of regional development policies. Thereto, they provided their target group – women wanting to realize their ideas of new businesses, innovations, projects etc – with business counselling, seminars and study visits. They also developed and used methods and models for analyzing and promoting entrepreneurship and innovation in areas such as private and public services, culture, tourism and ICT. The dominating organizational form of these activities has been projects. Several of the network members claimed that the short-term scope of projects had obstructed the realization of their long-term ambitions. One of the main strategies used by the four networks was to increase the cooperation between entrepreneurial women and to cross the boundaries of separate areas. By gathering individuals in greater agglomerations, they hoped to increase both the number of women realizing their ideas and their visibility and impact in regional development policies. These agglomerations were labelled as networks, but also as clusters or innovation systems. The discussions at the dialogue seminars and in the existing text material revealed that the network participants were well aware of that their efforts to link women's entrepreneurship and innovation to clusters and innovation systems contrasted with the norms permeating prevailing innovation policies and innovation studies. This contrast seems to have increased their motivation to participate in the process of developing and implementing regional policy programs.

The review of the empirical data exposes that the activities carried out by the four networks primarily have comprised the areas of services and creative industries, such as tourism, culture, events, health care, childcare and gender equality. In all networks except one, these areas have dominated. The exception was SAGA that also had arranged extensive activities on the area of ICT. In the other networks, there were only isolated examples of activities targeting other areas than services and creative industries. These examples concerned the food processing industry, manufacturing industries and ICT. Since the areas of services and creative industries employ many women – while ICT is a male-dominated field – three of the four networks thereby prioritized areas important to women's employment and entrepreneurship. What distinguishes the fourth network is that they additionally focused the importance of women's contribution to male-dominated industries.

In terms of innovations, a wide range of new services, methods and products can be distinguished in connection to the networks' activities. An entirely new system for Internet connection was for example developed by some members in one of the networks. Pioneering methods for mapping and supporting innovation systems and clusters in services and creative industries were developed in three of the networks. Wedding arrangements based on local cultural historical traditions is another innovation discerned in the empirical data. Also, digitalized home-help service to peripheral estates was developed, alongside Internet sales of Sámi handicraft. Methods supporting the realizations of women's business ideas were developed as well as a system for micro-credits to women in ethnic minorities. These innovations have clear links to the areas focused by the networks, such as services, creative industries and ICT. Again, a dividing line can be discerned between the three networks primarily focusing services and creative industries on the one hand, and the fourth network also focusing ICT, on the other.

According to the discussions at the dialogue seminars and their existing text documents, several of the network members share the view that the dominating understandings of innovation, clusters and innovation systems in innovation policy and innovation research do not take into account their own experiences of promoting women's entrepreneurship and

innovation. The concepts of clusters and innovation systems are perceived as alienating and imposed from above. The participants also pointed out that the Triple Helix model's emphasis on the three main actors in innovation systems – that is, government, business and academia – renders the role that non-profit organizations play in the promotion of innovation by policy networks. They also noted that men and certain industries had been allowed to set the standards on the area of innovation promotion, especially manufacturing, natural resources and ICT. The network members' own experiences of innovation promotion services and creative industries – representing areas being down-prioritized in innovation policies and innovation theories – seems to have been a joint reason for the networks' efforts to raise awareness of the importance of women's entrepreneurship and innovation. By introducing a new set of actors – innovative and entrepreneurial women – and areas – services and creative industries – the four networks have challenged the dominant view of how different actors and areas should be estimated in terms of innovation.

Regarding their interaction with the surrounding world, all four networks had contacts with actors from different societal sectors. The public, the private, the academic and the non-profit sector were all represented as target groups, cooperation partners, financiers, project owners, idea generators etc. Each network has, however, had differing contact with differing sectors. Emma RC, for example, had least contact with stakeholders in the private sector, while Enterpreneurial Women and Equal Conditions had least contact with the academy. All of the networks had extensive contacts with the public and non-profit sectors, in that these served as financiers, partners, target groups or idea generators. The empirical data also expose that the networks have interacted extensively internationally, in order to enforce their activities and achieve their objectives and to increase their legitimacy at home. The network members acknowledged that external actors have had great influence on their activities. This influence has been exercised for example by granting or refusing funding to different suggested activities. Often, the negotiations about funding have led to adaptation of the networks' initial ideas in order to better fit the policymakers' intentions. The stated (or lack of) symbolic support from public authorities, has thereto affected the self-esteem among the network members. Invitations to participate in the development and implementation of regional policy programs have also affected their feeling of being considered as important contributors to regional development. The relations to other business counselling bodies – both public and private ones – have also affected the network members' ability to realize their intentions. Whether or not the other business counselling organizations have been willing to interact with the networks and tried to increase their knowledge about gendered structures has affected the networks' ability to reach out with their services to their target groups. In some cases, the network participants perceived that they have been dismissed and ridiculed by officials and advisers who have argued that women (and others) working in services or creative industries lack knowledge, contacts and other prerequisites needed to realize an innovation or a business idea.

Several network members state that their activities and project proposals have been excessively scrutinized by public authorities in a way that is rarely experienced by men-dominated and men-oriented organizations. Among other things, the detailed accounts required in the budgets and financial reports to their financiers were claimed to exceed the requirements in policy programs targeting men-dominated areas. They have also been requested to present their results in a way that exceeds normal proceedings. The amounts granted to the networks have also been significantly lower than the amounts distributed to the men-dominated organizations enjoying founding from public programs to clusters and innovation systems. The long-term-scope of the network's ambitions was thereto obstructed,

due to lack of long-term funding. New projects must constantly be applied for in order to guarantee their survival, stealing time and energy from the networks' core activities. However, some of the network members felt that the attitudes of the external actors had changed over time, indicating that many years of hard work finally had bore fruit. This change was manifested in invitations to public events concerning entrepreneurship and regional development. It was also manifested in an unprecedented public rhetoric stating that policy networks promoting women's entrepreneurship and innovation would be included in the regional strategies concerning innovation systems and clusters. Whether these were actually integrated in the policy programs is still an open question, though.

Analysis

In this section, it will be analyzed how the bottom-up policy analysis tools of non-hierarchical implementation analysis and implementation structures enlighten the features and results of the four policy networks depicted above. This procedure serves to reveal how prevalent innovation policies and innovation theories ought to be developed in order to esteem the importance of a multitude of actors, areas and aspects, and ultimately to increase the understanding of the dynamics of innovation.

As described earlier, the non-hierarchical approach acknowledges how a wide range of actors might be influential in policy processes, e.g. in the promotion of innovation by policy networks. This makes it possible to detect both those actors who have been ascribed importance in prevalent innovation policies and innovation theories and those actors who have been ascribed a minor role. A non-hierarchical approach thereby implies that policies are studied from the perspective of different societal groups and service providers. Applying this approach to the empirical data, it is revealed that a group of actors and areas that up till now have been marginalized in innovation policies and innovation theories actually are active on the area of innovation promotion through policy networks. This group consists of women-led and women-oriented networks, promoting entrepreneurship and innovation within services and creative industries. These networks are aligned to Women's Resource Centres which are publicly funded centres providing services to women who want to realize their ideas of new businesses, innovations or projects. In the accounts of their activities it is exposed how the networks have involved not only their own members and main target group, but also external actors, in order to attain their goals. It is also revealed that their activities have been adjusted to requirements articulated by these external actors. This implies that on the area of policy networks promoting innovation, both governmental actors and other actors are important even though this variety is not reflected in prevalent innovation policies and innovation theories.

In this article, implementation structures are used as an analytical tool for studying the practical organization of policy networks promoting innovations and the conversion of innovation policy programs to political action. As described earlier, an implementation structure consists of a set of actors who have formed a common platform for cooperation in order to solve a jointly perceived policy problem. Implementation structures are formed as a result of the participants' own formulation of a policy problem as they understand it. Theoretically, implementation structures have been used as an analytical approach to increase the understanding of how policy programs are converted from text documents to practical action. Applying this approach on the empirical data, it is revealed that the four networks constitute examples of implementation structures in that they jointly have formed a common platform for cooperation in order to solve a jointly perceived problem on the area of innovation policy and theory. The network members' own formulation of the policy problem is that some actors and areas have been marginalized in the public promotion of innovation

systems and clusters on dubious grounds. When using implementation structures as an analytical tool in bottom-up policy studies, the scope of important actors is an empirical question. One common method used to map which actors are involved in a particular policy network is to base the identification on the participants' own perception of who is involved. The empirical data exposes that the four networks perceive a wide range of actors and areas as important to their promotion of innovation. According to their statements at the dialogue seminars and in their existing text documents, women are important as entrepreneurs and innovators in their policy networks, especially within services and creative industries – which are industries employing many women in Sweden – but also within other industries, such as ICT. Moreover, external actors from four different societal sectors have proven to be relevant to their activities. These are the public, private, academic and non-profit sectors. The two basic questions of implementation structure studies have thus been answered: What is the problem to be solved? and Who participates in the solution of the problem?. The additional questions concerning how the various actors are involved, with what specific strategies and with what purposes are addressed in the recite of the external actors contributions in terms of constituting target groups, cooperation partners, financiers, project owners and/or idea generators.

As noted previously, the tools for bottom-up policy analysis discussed above – the non-hierarchical approach and implementation structures – may be enriched by existing theories of how innovation systems are organized. Innovation systems can be portrayed as consisting of two parts: components and relationships. The components correspond to the different organizations and institutions that the actors involved in the system represent. The relationships acknowledge how these components interact with each other. By combining these theories of innovation systems – which show how actors cooperate in order to develop innovations – with a bottom-up approach – not taking any actor's involvement for granted – it is possible to study policy networks promoting innovation in a way that differs from the usual approach of innovation policy and innovation research. The empirical data indicates that the four networks promoting women's entrepreneurship and innovation might very well be classified as innovation systems in that they have gathered actors from different sectors in order to develop new knowledge and enhance innovation. Their way of organizing themselves is thus consistent with the logic of innovation systems. This is unveiled thanks to the bottom-up approach's ability to acknowledge a wide range of actors and areas as important, not only the ones mentioned in prevalent policy programs or research studies. Contemporary innovation policies and innovation theories have been characterized by a top-down approach, in that they – by gazing down from a superior position – have identified only a limited scope of actors and areas as relevant to innovation promotion by policy networks. Milieus focusing women as actors and areas employing many women have systematically been excluded from these policies and theories. In contrast, the empirical data suggests that a bottom-up approach could highlight the importance of a broader spectrum of actors and areas taking its starting point in the initiatives taken by the four networks at grass roots level.

The empirical data thus portrays how the four regional networks are coherent with the main classification of innovation system. However, they have not unconditionally accepted the prevalent norms for how innovation promoting policy networks are supposed to be organized. Rather they have challenged these norms by expanding the range of relevant actors and areas in such policy networks. Besides women and services industries, they have also involved the non-profit sector contributing with new ideas, continuity and knowledge. They have thereto expanded the range of innovations emanating from policy networks, including new services, methods and experiences besides new technological products. Some of these features will

now be related to the aspects of innovation theory and innovation policy presented earlier in this article. In Swedish innovation policies, a distinct priority pattern is to be seen, as depicted earlier. The areas enjoying public support could primarily be derived to three groups of industries: basic industries, manufacturing industries and industries based on new technologies. A fourth group of industries adhered to the ones enjoying the least support: services and creative industries.

This pattern of priority among different industries implied that certain actors benefited more than others, due to the segregated labor market in Sweden. Almost all of the men-dominated sectors and industries were among the industry groups given a high priority in the Swedish innovation policy programs and almost all of the areas employing most women belonged to the group of industries being down-prioritized in the innovation policy, namely services and creative industries. The great majority of the innovation systems and clusters being prioritized in Sweden's innovation policy programs were thus based on areas mainly employing men as employees or entrepreneurs. This narrow scope of actors and areas corresponds to a top-down approach where only a few, centrally distinguished, policy networks are ascribed an important role in promoting innovation. In contrast to this priority pattern, the empirical data presented in this article widens the spectrum of actors and areas of relevance to innovation promotion by policy networks. The four networks prove that women-led and women-oriented policy network do exist and that they are truly active in promoting innovation, especially within services and creative industries, but also in ICT. In order to better captive the empirical variety of actors and areas, innovation policies ought to be sculptured in a different manner. The exact forms of this re-formation are discussed in the upcoming section, where conclusions are drawn concerning the causal relation between context, organizational features and outcomes.

As noted earlier, Triple Helix is one of the central concepts in innovation research employed to study how policy networks promoting innovation are organized and can be classified. It is also employed as a policy tool to promote innovation. Business, government and academia are the three parties distinguished in this model as pivotal in such policy networks. By ascribing superiority to certain actors and areas while marginalizing others, Triple Helix is consistent with a top-down perspective as analytical approach and policy tool. The empirical data presented here indicates that the Triple Helix does not fully cover the scope of actors discerned as important in policy networks promoting innovation. Besides business, government and academia, a fourth type of actor is considered of importance: the non-profit actors. In order to better captive the empirical variety, the model ought to be adapted in certain ways. The specific details of this adaptation are discussed in the upcoming section of this article, where conclusions are drawn concerning the causal relation between context, organizational features and outcomes.

Another classification of innovation systems that was highlighted in the earlier section distinguishes between Institutional Regional Innovation Systems (IRIS) and Entrepreneurial Regional Innovation Systems (ERIS). As described, IRIS is based on existing structures for public knowledge production and knowledge transfer, relying mainly on engineering skills, planning its development process far in advance on a long term perspective and primarily involving established organizations as main actors. In contrast, ERIS lacks established networks and resources, involving individual actors being linked to each other when the need arises, developing without long-term planning and being constructed from scratch in an ad-hoc manner. This type of classification, distinguishing between a top-down and bottom-up way of organizing innovation systems, makes it possible to detect and analyze policy

networks beyond the delimitations of the prevalent priority pattern in innovation theories and innovation policies.

The four networks in the empirical data of this article correspond to the ERIS type of innovation systems, rather than the IRIS type. Specifically, they have organized their policy networks ad hoc, from scratch, engaging actors perceived as important at the moment without following established institutional proceedings. The ERIS classification thus renders the four policy networks visible as innovation systems. As was also stated earlier, the nature and results of innovation processes differ depending on whether the inventors are situated within large organizations, or if they realize their inventions on their own. In addition to acknowledging different types of innovation systems, the ERIS and IRIS classification makes it possible to analyze the causal relation between context, organizational features and outcomes in policy networks. Depending on the context of the actors (if they are part of established, institutional policy networks or if they lack such relations), the innovation systems is formed either top-down or bottom-up (that is, either with an established set of actors or from scratch), which in turn affects the results (what types of innovations that are engendered). This is reflected in the empirical data, exposing that the four networks have not been a part of existing institutional policy networks, which implies that they have organized themselves ad-hoc, resulting in a broad range of innovations in terms of new services and methods.

The empirical data calls for a yet further refinement of the causal relation identified in IRIS/ERIS, however. Specifically, the network members testify that attitudes and standards adopted by external actors have affected their room of manoeuvre to execute their network activities as intended. This influence has been exercised for example by public authorities when granting or refusing funding, when stating their symbolic support and when inviting to participate in the process of developing and executing regional policy programs. It has also been exercised by various business counselling bodies when willing or refusing to interact. The network members claim to have been dismissed and ridiculed by officials and advisers, based on stereotype gender constructions. The experiences of being marginalized on the areas of entrepreneurship and innovation have expelled the four policy networks from the institutionalized types of innovation systems, forcing them to create their own contacts and gather their own resources from scratch. The marginalization has thus evoked the construction of ERIS types of innovation system. Ultimately, the marginalization might have evoked the specific types of innovations emanating from the networks. This causal relation is further explored in the upcoming section.

Having analyzed how bottom-up policy analysis tools can make a broader spectrum of actors and areas visible as important to innovation promotion by policy networks and how this relates to existing innovation theories and innovation policies, the upcoming section will reveal what conclusions can be drawn from this analysis, concerning the causal relation between context, organizational features and outcomes.

Conclusions

In this final section, conclusions are drawn concerning the four hypotheses presented in the beginning of this article. It will also be discussed how these conclusions call for further development of innovation theory and policy. This development is ultimately spurred by the analysis of a new set of empirical data.

As stated earlier, a twofold analysis – treating policy networks both as independent and dependent variables – can be enhanced by the formulation of specific hypotheses to be empirically tested. Concerning policy networks as dependent variable, two hypotheses were formulated: 1) that policy networks emerge and are shaped differently in different contexts, and 2) that policy networks emerge and are shaped differently depending on the definition of the policy problem to be solved. Regarding policy networks as independent variable, another two hypotheses were formulated: 3) that the specific organizational features of a policy area affect what outcomes that are evoked in terms of resource allocation, scope of participation, new products and services 4) that the specific organizational features of a policy network affect what outcomes that are evoked. These will now be tested against the empirical data.

The first hypothesis – that policy networks emerge and are shaped differently in different contexts – is proven by the empirical data, in that it reveals how women as entrepreneurs, innovators and organizers of policy networks – as well as areas employing many women – have been marginalized in a way that have forced them to form their own, new networks in order to realize their ideas. The experience of being marginalized is thus an important aspect of context. Depending on the context of the actors (if they are part of established, institutional policy networks or if they lack such connections), the innovation systems are formed either top-down or bottom-up (that is, either with an established set of actors or from scratch), which in turn affects the results (what types of innovations that are engendered). This is reflected in the empirical data, exposing that the four networks have not been a part of existing institutional policy networks, instead organizing themselves ad-hoc, resulting in a broad range of innovations in terms of new services and methods.

The second hypothesis – that policy networks emerge and are shaped differently depending on the definition of the policy problem to be solved – is proven by the empirical data, in that the four networks motivated their activities by the perception that women's contributions to regional development were ignored and that the conditions for running businesses were unequal for women and men. The network members had experienced that entrepreneurial men and areas employing many men were prioritized in regional and national policy programs and research studies at the expense of entrepreneurial women and areas employing many women. This was their definition of the policy problem on the area of innovation promoting policy networks. Since they represented a marginalized group of actor and areas in innovation policies and innovation studies, the established ways of realizing innovations in pre-existing policy networks were closed to them. And since their definition of the policy problem implied a critique of prevalent innovation theories and innovation policies, they were inclined to organize policy networks that differed from the ones being prioritized top-down. Their organizational concept differed mainly regarding the scope of actors and areas considered as important in policy networks promoting innovation.

The third hypothesis – that the specific organizational features of a policy area affect what outcomes that are evoked in terms of resource allocation, scope of participation, new products and services – is proven by the empirical data, in that the outcomes of the four networks' activities are more equally distributed resources among women and men than the one-sided priority pattern exposed in prevalent innovation policies. According to their way of organizing, women and men as entrepreneurs and/or innovators – as well as areas employing many women or men – deserve to be offered the same long-term public funding of innovation systems and clusters. The resource allocation thus looks different in the four network's version of innovation promotion, implying a more balanced distribution among different actors and areas. Moreover, the scope of participation is altered by including environments

engaging many women, hitherto being marginalized in policies and theories. Finally, new products and services are evoked representing a wider range of new solutions to existing problems and needs. These outcomes can all be regarded as a reaction to the prevalent features of the innovation policy area, ascribing superiority to certain actors and areas while marginalizing others by means of a top-down approach. The third hypothesis – that the specific organizational features of a policy area affect what outcomes that are evoked in terms of resource allocation, scope of participation, new products and services – is thus proven. This hypothesis is also proven by the effect that the political and theoretical marginalization has had on the type of innovation systems being formed by the four networks. The experiences of being marginalized on the areas of entrepreneurship and innovation have expelled them from the institutionalized types of innovation systems (IRIS), forcing them to create entrepreneurial types of innovation systems (ERIS) based on contacts established ad hoc and resources gathered from scratch.

The fourth hypothesis – that the specific organizational features of a policy network affect what outcomes that are evoked – is proven by the empirical data, in that the organizational features of the four networks seem to have shaped their outcomes. Specifically, their establishment of ERIS types of innovation systems – ascribing an important role to hitherto marginalized actors and areas, such as women, non-profit organizations and services industries – appears to have engendered innovations that reach beyond those who are already being promoted in contemporary innovation policies and theories. The innovations emanating from the four networks embrace a wide range of new services, methods, processes and organizational solutions. Several of the innovations address the experience of being marginalized in policy and research by suggesting different methodological and organizational ways to highlight the importance of services and creative industries – as well as of women-led and women-oriented environments – to innovation, entrepreneurship and regional development. These are for example methods supporting the realizations of women's business ideas, as well as methods for mapping and supporting innovation systems and clusters in services and creative industries. Yet other innovations emanates from experiences made within services or creative industries, such as handicraft, home-help service and historical-cultural wedding arrangements. These outcomes can all be regarded as a consequence of the distinct features of the ERIS type of innovation systems, engaging a wide range of actors and areas as they prove their importance in practice. The fourth hypothesis – that the specific organizational features of a policy network affect what outcomes that are evoked – is thus proven.

As conclusions have been drawn concerning the four hypotheses above, it will now be discussed how these conclusions call for further development of innovation theory and policy.

The conclusions drawn call for further development of existing theories on how innovation is promoted by policy networks. The theoretical development includes the establishment of a causal relation between marginalization, type of innovation system and outcomes, which has been revealed in this article by analyzing a new set of data by means of bottom-up tools for policy analysis. This causal relation states that the marginalization of certain actors and areas in prevalent innovation policies and theories has evoked entrepreneurial types of innovation systems (ERIS) based on contacts established ad hoc and resources gathered from scratch. It states further that the ERIS type of innovation systems has spurred the development of a wide range of innovations, including new services, methods and organizational solutions. This causal relation between context, organization and outcomes motivates further development of existing innovation theories to acknowledge the relation between context, organizational

features and outcomes. Future innovation studies could map varieties of this causal relation in different contexts and in regard to additional types of power structures, such as class, ethnicity and age.

Policy implications to be drawn from the conclusions primarily comprise the need for a broader inclusion of actors, areas and innovations when mapping and prioritizing policy networks promoting innovation. Networks that hitherto have been marginalized in policies and theories – representing women-led and women-oriented environments as well as non-profit actors – ought to be acknowledged and allowed to prove their importance empirically instead of being dismissed in advance. Marginalized areas – such as services and creative industries as well as the non-profit sector – ought to be acknowledged and promoted in the same manner. The same goes for innovations in the form of new services, method and organizational solutions. The policy efforts on the area of innovation could thereby increase their effectiveness in that it would not miss out certain actors and areas with potential to contribute to innovation and regional growth. This is congruent with the ambitions stated in Innovation Union, one of the flagship initiatives in the EU2020-strategy, emphasizing "smart, sustainable and inclusive growth". These ambitions include

> "Pursuing a broad concept of innovation, both research-driven innovation and innovation in business models, design, branding and services that add value for users and where Europe has unique talents. The creativity and diversity of our people and the strength of European creative industries, offer huge potential for new growth and jobs through innovation, especially for SMEs."
>
> "Involving all actors and all regions in the innovation cycle: not only major companies but also SMEs in all sectors, including the public sector, the social economy and citizens themselves ('social innovation'); not only a few high-tech areas, but all regions in Europe and every Member State, each focusing on its own strengths ("smart specialisation") with Europe, Member States and regions acting in partnership."
>
> (*Europe 2020 Flagship Initiative Innovation Union* 2010, p. 7-8)

A broadened spectra of actors, areas and innovations in innovation policies would also create a more equal allocation of public resources, promoting labor market development in a way that harmonizes both with the increased importance of knowledge intense industries and with the two principal aims of the Swedish government's gender equality policy: to combat and transform systems that preserve the gender-based distribution of power and resources in society, and to ensure that women and men enjoy the same power and opportunities to shape their own lives (www.regeringen.se/sb/d/11503/a/130715, 21 March 2011).

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