

The logo for CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy) features the word "CIRCLE" in a bold, sans-serif font. A golden arc is positioned above the letters, starting from the top of the 'I' and ending at the top of the 'E'.

C I R C L E



LUND  
UNIVERSITY

Paper no. 2008/02

# The Development of a New Swedish Innovation Policy A Historical Institutional Approach

Bo Persson ([bo.persson@circle.lu.se](mailto:bo.persson@circle.lu.se))

CIRCLE, Lund University

Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE)

Lund University

P.O. Box 117, Sölvegatan 16, S-221 00 Lund, SWEDEN

<http://www.circle.lu.se/publications>

ISSN 1654-3149

**WP 2008/02**

**The Development of a New Swedish Innovation Policy a Historical Institutional Approach**

Persson Bo

**Abstract**

It is often claimed that what traditionally have been called technology policies in many industrialised countries have undergone major changes during the last decades. Until the 1980s technology policies were primarily focused on financial support to different R&D producing organisations. The focus from the 1990s and forward has to a larger extent been on enhancing the environment for innovation and technology transfer. The rationale behind these innovation policies, as the “new” policies are often called, seems also to have been strongly influenced by a “new innovation paradigm”. Even though innovation policies in different countries seem to have developed in similar directions, and been inspired by similar ideas, the actual choices of policies in different countries, varies a lot. As shown by a large number of studies in comparative public policy, similar policy ideas can be handled or “translated” in very different ways due to different national policy styles, institutions, cultures, etc. In this text, I elaborate on these issues in an analysis of the development of a “new” innovation policy in Sweden, in many ways inspired by the new innovation paradigm, primarily during the last decade. I show how the new Swedish policy is strongly connected not only to the legacies of policy development, but also to the character of political strategies and the structure of the state bureaucracy.

**Keywords:** innovation policy, public policy, institutional theory.

Disclaimer: All the opinions expressed in this paper are the responsibility of the individual author or authors and do not necessarily represent the views of other CIRCLE researchers.

LUND UNIVERSITY

29/02/2008

Research Policy Institute/CIRCLE

Bo Persson

**The Development of a New Swedish  
Innovation Policy  
A Historical Institutional Approach**

Introduction .....	3
From technology policy to innovation policy: a paradigmatic change? .....	6
Understanding policy change: an historical institutional perspective.....	9
The policy legacy: Swedish technology policy from the 1940s to the 1990s .....	14
A new Swedish innovation policy?.....	23
Analysis: ideas, interests and policy feed backs .....	37
References .....	45

## **Introduction**

It is often claimed that what traditionally have been called technology policies in many industrialised countries have undergone major changes during the last decades. Until the 1980s technology policies were primarily focused on financial support to different R&D producing organisations (firms, universities, institutes), sometimes integrated into large collaborative programs. The focus from the 1990s and forward has to a larger extent been on “enhancing the environment for innovation and technology transfer” (Georghiou 1998). Even if the core elements of the new policies are still similar to what has traditionally been called technology policies, they are also usually defined as being somewhat broader, integrating elements of other several policy areas, such as research policy, education policy, economic policy etc. Even though funding still forms an important part of most national policies in this area, it is often combined with other instruments of support, such as creating institutional structures and different incentives for cooperation. The rationale behind these *innovation policies*, as the “new” and broader technology policies are often called, seems to have been strongly influenced by new concepts developed by social scientists within the fields of innovation studies and institutional and evolutionary economics. This set of concepts is sometimes referred to as the “new innovation paradigm” (Biegelbauer and Borrás 2003; Mytelka and Smith 2002). The role of the state should, according to ideas underlying this new paradigm, no longer only be to support R&D, but the whole dynamic process, or system, in which innovations develop, diffuses and are utilized (Edquist 1997; Fagerberg et al. 2005).

The development of innovation policies fits rather neatly with a popular way to describe recent changes in public policy and the manoeuvrability of the state, namely the shift from “government to governance”. This formulation expresses the view that the capacity of the state to solve problems is dependent to a larger extent than ever before on its ability to coordinate “existing policies”, rather than create new ones. Many new policy initiatives are also more based on persuasiveness and institutional changes, rather than classical steering instruments such as regulations, subsidies and financial grants. The focus is often on building networks and changing relations through, for example, institutional design or network management (Painter and Pierre 2005; Pierre 2004). One reason for this development is probably the process of globalisation, which has limited the possible options for strictly national industrial policies, but also increased the interaction between policy-makers in different countries, in particular within the European

Union. The development of governance is also often claimed to be a result of new strategies of the state to mobilise resources in a situation where the possibilities for taxation is more limited, (Rhodes 1997).

Even though innovation policies in different countries seem to have developed in similar directions, and been inspired by similar ideas, the actual choices of policies in different countries, varies a lot. The core of the new “innovation policy paradigm” also seems to be rather unclear. As shown by a large number of studies in comparative public policy, similar policy ideas can be handled or “translated” in very different ways due to different national policy styles, institutions, cultures, etc. (see for example (Biegelbauer and Borrás 2003). Innovations researchers Lynn Mytelka and Keith Smith claim, for example, that it is very uncertain what conclusions should be drawn from the new theoretical perspectives that are often claimed to underpin new innovation policies in the industrialised countries. No clear recommendations on courses of action or policy instruments follow from the perspectives (Mytelka and Smith 2002). This implies that national choices of policy instruments will to a large extent probably be influenced by the different institutional frameworks, political cultures, etc. in different countries. Another problem seems to be that the definition of the policy area itself, innovation policy, is somewhat “fuzzy” and is constructed in different ways in different countries, which sometimes makes it hard to do comparisons.

In this text I will elaborate on these issues in an analysis of the development of the “new” Swedish innovation policy, in many ways inspired by the new innovation paradigm, primarily during the last decade. During this period, the Swedish government took a number of initiatives to formulate a new so-called innovation policy, with a somewhat different focus than earlier technology policies. One expression of this was the creation of a Swedish agency for innovation system, VINNOVA; another was the launching of a more elaborate politically rooted innovation strategy around the turn of the millennium. The new initiatives were explicitly related to a system view of how innovation processes should be understood (see for example Jacob 2006), and were also to a greater extent than earlier technology and research policies, based on an intention to

promote coordination and cooperation between different policy areas. In what follows, I will describe these initiatives as a “new Swedish innovation policy”.<sup>1</sup>

The development of a new innovation policy in Sweden, as elsewhere, raises interesting questions about the logic and development of public policy. How have the ideas, goals and policy instruments developed in this policy area during the last decade? What has characterized the development of the Swedish innovation policy and how does it relate to new ideas of innovation? How has the new paradigm been interpreted and used in the Swedish context? Many observers in Sweden and elsewhere have argued that Sweden, compared to many other industrialised countries, actually lacks an innovation policy, raising questions of how well the new policy has worked in practice (Bergström 2006; Gergils 2006).

In contrast to several earlier studies, my focus here is not only the formulation phase (that is, the ideas, goals and objectives of policy), but also on aspects of the implementation phase (that is, the choices of policy instruments and steering strategies). Further, I will try to analyse the dynamics of the new Swedish innovation policy on the basis of a historical institutional understanding of public policy change. I will thus examine its development in “the light of history”, trying to present the policy legacies relevant for the new innovation policy. What factors are important for explaining the dynamics of its emergence and application? I will show how in this respect the Swedish policy is strongly connected not only to the legacies of policy development, but also to the character of political strategies and the structure of the state bureaucracy.

It is important to emphasize that the purpose of this text is not to describe the historical details of the development of Swedish innovation policy, but to present a preliminary analysis of important aspects of the logic of policy change and present some hypotheses for further research.<sup>2</sup> It is also important to point out that the main focus of the text is the specific innovation policy initiatives taken by the Swedish government around the turn of the millennium. Although the study is contextually and historically situated, other policy events and trends related to changes in innovation policy, such as the general development of research and industrial policy, are not the

---

<sup>1</sup> In this analysis I choose to focus on a number of initiatives in order to establish or frame a new policy area; I don't at this stage assume anything about the “depth” or the strength of the institutional establishment of this new policy area.

<sup>2</sup> This is a working paper presenting preliminary research results (work in progress).

main focus. Furthermore, innovation policy as a concept is here discussed as a context-specific phenomenon that is, as a new way to package policy, claiming to be different from how policy is usually discussed, and explicitly related to the new innovation paradigm. Of course, the extent to which this has been the case with the new Swedish innovation policy formulated over the past decade is an empirical question.

The analysis is mainly based on written material. The primary sources include documentary material such as government bills and reports, but the study also relies to a large extent on secondary material, including research literature such as my own earlier work on Swedish research and technology policy (primarily Persson 2001). It is also based on a limited number of interviews with a few “key” informants.<sup>3</sup>

In the next section I will present a short discussion of conceptual issues related to technology and innovation policy, and the international trends in this area. After that, I will outline a framework for analysing policy change, based on a historical institutional perspective. In the fourth section, I will present a sketch of Swedish technology policy; that is, the legacy inherited by the new innovation policy. In the fifth section, I will present an analysis of the new innovation policy; and, finally, in the last section, I will present a theoretically informed analysis about how the process of policy change can be understood in this case.

### **From technology policy to innovation policy: a paradigmatic change?**

Before going into policy development in the Swedish case, I will discuss briefly, but in somewhat more depth than in the introduction, what is generally meant by the trend from what traditionally has been called technology policy towards a new innovation policy and the implications of this new paradigm. What has generally been meant by technology policy is formulated quite well by Paul Stoneman, who defines technology policy as “policy with the intention of affecting the process of technical innovation” (Stoneman 1987). It is however difficult to use a stipulated definition, if the research, as in this case, is focused on how a specific view of policy has been adapted, and how it has developed over time. Lundvall and Borrás (2005) state that technology policy refers to policies that “focus on technologies and sectors”. Historically, it is, in their view also strongly connected to state strategies for realising broader objectives such as national

---

<sup>3</sup> The intention is to do further interviews within the framework of a project about Swedish innovation policy in a comparative perspective.



security and economic competitiveness (Lundvall and Borrás 2005). What, then is, meant by what is sometimes called innovation policy and “the new innovation paradigm”, and what are the policy logics, instruments, etc. associated with this paradigm? And how does it differ from what was earlier called technology policy?

According to Lundvall and Borrás (2005), the new paradigm is linked to a “long-term outcome of research on innovation and economic evolution” (Lundvall & Borrás 2005). Similarly, Borrás and Biegelbauer relate the new paradigm to “evolutionary and institutional economic theory” (Biegelbauer and Borrás 2003). Compared to neoclassical economics, which is claimed to have dominated much thinking in earlier technology policy, the ideas behind the new paradigm are more “dynamic”, emphasising the social embeddedness of innovation, and the role of entrepreneurs in economic and technological development. While neo-classical economists emphasise the importance of a functional infrastructure (concerning for example patents) and the governmental provision of research funding, the ideas behind the new paradigm emphasize the role of collaboration, networks and dealing with “system failures” rather than “market failures”. The paradigm can in a similar way be contrasted to a traditional view of research and technology policy, where the focus is on allocating the right amount of resources to R&D producing institutions, without putting much emphasis on commercialisation or diffusion.<sup>4</sup>

Although, as stated in the introduction, the new paradigm is somewhat vague in what policy recommendations can be drawn from it, it is generally associated with, if not always directly linked to, a number of policy reforms and instruments. Firstly, as pointed out above, the perspective seems to emphasize an inherently broader policy approach. To some extent, its the recommendation is to integrate or coordinate different policy areas and lead them in the same direction, or at least persuade different policy actors to take the innovation perspective into account within “normal” decision making. The innovation paradigm apparently implies a meta-

---

<sup>4</sup> For example, in a classic article the American economist Kenneth Arrow argued that certain characteristic of scientific knowledge, uncertainty, unappropriability and indivisibility, would lead to underinvestment of R&D in a perfect market. The role of the government would therefore be to intervene and correct this market failure by, for example, supporting R&D, patent regulation etc (Arrow 1962). The system of innovations perspective, which has been one academic perspective important for the new paradigm, emphasises instead that innovation processes evolve in interaction with different actors, both private and public, and that the analyses of policy instruments must be based on systematic empirical analyses, not deductive theories (Chaminade & Edquist 2005).

perspective on policy. The shift towards this new paradigm is generally also associated with a focus on certain instruments and strategies such as supporting innovative SME:s, providing risk-venture capital, supporting exploitation of knowledge, facilitating organisational adaptability etc. In the words of Biegelbauer and Borrás innovation policy is “not only focused on promoting innovation within the institutional context (like traditional science- and technology policy), but also on changing the institutional context in order to promote innovation (for example reform of universities, education, capital markets, regulation of industries, competition law)” (Biegelbauer and Borrás 2003).

It is obvious that, as is often the case, the “object of comparison” is not always clear cut, it is hard to compare how innovation policies have developed in different countries since the phenomenon under study might, although labelled in a similar way, have different meanings (See for example Hague and Harrop 2005). It is also important to point out that the distinction between old and new paradigms is often also somewhat exaggerated. Technology policies were, for example, not always based on an explicit neoclassical model; the ideas underpinning them were often more “pragmatic” or connected to sectorial goals. It is very likely that these policy developments were more incremental, connecting both ideas and more concrete policy instruments, than is often implied. Furthermore several types of policies, underpinned by different rationalities or systems of ideas can also exist at the same time, as different layers are added to an existing structure (compare Thelen 2003). It is hence not always a matter of turning earlier types of policies, for example technology policies, into more up-to date policies, e.g. innovation policies. In fact, elements of both kinds of policy can co-exists over time (Lundvall & Borrás 2005). None of this, however, invalidates the hypothesis that it is still possible to observe some kind of shift in this policy field, not least in how policy is “framed” and legitimized.

How has the development toward a new innovation policy been understood in earlier studies? Borrás and Biegelbauers (2003) study about the incorporation or adoption of the innovation paradigm in a large number of industrialised countries shows that the perspective has been widely accepted in most countries. There are however a lot of variations in precisely how the ideas have been adopted. In many countries, the changes have been mostly a matter of rhetoric and discourse, while in others the paradigm has, allegedly been influential on a “deeper level”. Countries like Denmark, Finland and the Netherlands have, for example, “fully embraced the innovation paradigm”. Borrás and Biegelbauer also point to the fact that one reason for the

popularity of the paradigm and the associated ideas probably is its “fuzziness”: it can be interpreted and filled with almost any kind of content. Important factors for explaining the development in the three examples of where the paradigm has been “embraced”, seem to be highly related not only to the character of the states (small, “competitive” and consensus oriented), but also to how the economic crisis of the 1990s was understood, as well as to the strategies of specific actors. It also interesting to notice some common characteristics of changes in innovation policy: the political actors that have led the transformation have been “relatively few”, thus pointing to a rather closed community of actors. The cases of Denmark and Finland do, however, include quite a lot of interplay between state actors and different stake holders (Borras and Biegelbauer 2003).<sup>5</sup>

Finally it is also important to point out that the innovation policy paradigm has also developed in parallel, partly complementary, and to some extent in competition with the more meta oriented doctrine New Public Management (NPM) (Hood 1995). The pressure on public programs to imitate the market and private firms have, for example, led to a stronger emphasis on bench marking and other quantitative methods for measuring results. It can be argued that the somewhat risk oriented and unpredictable character of policies connected to research, technology, and innovation creates a particularly strong need for knowledge about both how to set priorities, foresee the future, and, not least, try to evaluate the results. Generally, for example, the use of evaluations in science and technology has increased during the last decade or so (Kuhlmann 1998). Increasing globalisation and therefore competition between countries, combined with tighter public budgets, seems to have increased the desire among policymakers to “know what works and how to make it better” (Georghiou 1998).

### **Understanding policy change: an historical institutional perspective**

The main focus of this paper is different kinds of “policy change”. There exists an extensive literature on the questions of “what public policy is” or how it should be defined (see, for example, (Hill 2005). Here I simply choose to take my starting point in the often used definition by Hugh Heclo, who defines public policy as “a course of action or inaction pursued under the authority of government” (Heclo 1974). For my purposes it is also important to emphasize that

---

<sup>5</sup> Research results relevant for the development of Swedish innovation policy will be discussed in the following sections.

changes in policy can occur on different levels and to varying degrees depart from existing policies. Some changes involve major reformations of goals, some involve minor changes in the functions of policy instruments. The political scientist, Peter Hall, for example, distinguishes three kinds of variables involved in policy making and change: 1) the overarching goals in a particular policy field, 2) the techniques or policy instruments, and 3) the specific instrument settings. He also distinguishes between “normal policy change”, and “atypical policy change”. Normal policy change concerns changes in the kinds of instruments used, as well as in the settings or the more precise use of policy instruments, whereas atypical policy change also involves changes in the goals of policy (Hall 1993). Howlett and Ramesh have elaborated on this model, finding it more useful to identify four different types of changes, depending not only on whether the changes involve ends or means, but also on the level of generality. Changes in ends can involve policy goals (overall level) or program specifications (practical level); changes in means can concern instrument types (overall level), or instrument components (practical level) (Howlett and Ramesh 2003). Although the differences between the Hall and Howlett and Ramesh models are minor, an important contribution of the latter is in my view that it emphasises the important role of policy instruments: the choice of instrument is not only an administrative decision; it can be at least as important as the goals of policy (Majone 1989).

Kathleen Thelen (2003) has elaborated and partly argued against this perspective, trying to specify the mechanisms for a more nuanced understanding of the balance between rigidity and change in a historical perspective. She maintains that changes in the institutional framework of policy is not always radical, and do not always have the effect of reproducing of decisions taken at a formative moment. Instead she holds that change is often incremental. According to her view, institutions change either by incorporating support from new actors or by redirecting themselves towards a new set of goals. Two mechanisms that are especially important in this process are, according to Thelen, layering and conversion. Layering refers to the process of bringing new institutional structures to an existing organisation, whereas conversion refers to a new set of goals to new purposes, towards which existing institutions may be redirected (Thelen 2003). An important point is that institutional and policy change sometimes occurs in an incremental manner, and often under the surface. It may be accomplished, for example, by means of “decoupling” strategies, but sometimes also through more radical changes, due to pressure from strong interests, often due to the entry of new actors in a policy area.

The overall framework for my analysis of Swedish innovation policy is based on what is called historical-institutionalism (Thelen 1999; Thelen and Steinmo 1992). This perspective generally emphasises that policy changes occur through interaction between interest-driven forces and institutional contexts, and between internal and external events. As a variant of institutional analysis it hence highlight the importance of institutional factors, but also stresses that policies are “path dependent” in that they are strongly influenced by the “policy legacies” of earlier policy development (Hall and Taylor 1996). This makes it crucial to study policy processes in a historical and context-sensitive manner. Furthermore, authors in this field have stressed the importance of ideas in the political system, and how different ideas are structured by institutional factors (Hall 1993; Pierson 2004; Weir 1992). Referring primarily to the works of Peter Hall I will now elaborate on the central concepts of the historical institutionalist perspective, primarily structured around the works of Peter Hall, and their relevance for innovation policy change.

A central concept in all institutional theories is naturally that of “institution”. Compared to, for example the rational choice version of institutional theory, which tends to limit the concept to more formal rules and regulations, the researchers working within the historical institutional field have a somewhat broader view. An often used definition is the one by Peter Hall who defines institutions as “formal rules, compliance procedures and customary practices that structure the relationship between individuals in the polity and economy” (Hall 1993, p. 96). Institutions are in this perspective often seen as factors that not only constrain or enable strategies, but also facilitate certain ideas and values, which also function as guidelines for the actors. Hence, the preferences of actors are not external to the institutions but formed by the actors’ interplay with the institutions. Important institutional factors in technology and innovation policy are, for example, the institutional structure of the state civil administration, the regulation of responsibility between different levels of government, the systems of rules constituting specific agencies, and the standard operating procedures and rules for the bureaucracies’ engagement in policy-making. Of specific interest here is also the strongly institutionalised system of state commissions of inquiry, which according to some studies of Swedish policy making in a comparative perspective, have facilitated the communication between experts, interest groups and the state (Hecló 1974; Steinmo 1993).

Public policy is thus considered to be formed through the interplay of different elements of the policy-making system, thus allowing for “strategic action” within institutional constraints. At the same time, the historical institutionalist perspective has its roots in a “state centric” tradition that has often emphasized the role of bureaucracy in policy development and change, frequently reacting to a Marxist tradition of emphasizing economic interests as the main drivers of change (see for example Skocpol 1985)). While Peter Hall and other later historical institutionalists generally agree that the role of bureaucracy and experts are important, they argue that the relative importance of different types of actors tends to vary depending on the level of policy making. Hall states, for example, that while changes in the “setting” of policy instruments, and to a large extent also actual choices of instruments, are processes where the power of bureaucracy is important, this is less the case with more radical changes of policy, where the influence of politicians and other societal actors tends to increase (Hall 1993). In the adoption of the Keynesian paradigm in the 1930s and 40s, the role of the governing party was, for example, very important (Hall 1989). I would argue, in line with theories of policy networks, that the importance of different types of actors is also highly dependent on the type of policy areas, and the networks or actor constellations connected to a specific area. While some policy areas are, for example, more closed and dependent on specific expertise and a smaller number of interest groups, others are more open and more dependent on changes in public opinion (Bressers and O’Toole 1998). As technology and innovation policy can be regarded as a rather “technocratic” policy area, it is reasonable to expect that bureaucracy would hold a strong position in the network. What is interesting is whether, in line with Hall’s reasoning, the policy development process is more “open” for influences from different types of actors during major changes in policy.

The most specific characteristic of the historical institutionalist perspective, partly separating it from other institutional perspectives, is the emphasis given to the history of a given policy or policy area, expressed with concepts such as “policy legacy”, “path dependency”, “feedback processes”, and “formative moments” (Hall and Taylor 1996). These concepts are all trying to express the ideas that new policies are often reactions to, or consequences of, old policies. The path dependency concept implies that policies often follow certain trajectories that it becomes progressively harder to depart from over time, at least in a radical way. A central argument among many researchers using this approach is also that at certain crucial points in time or

formative moments, due, for example, to an economic crisis the institutional set-up and/or policy structure in a specific policy area is partly “frozen”, which makes radical change difficult until a new major opportunity occurs (Rothstein 1992; Thelen and Steinmo 1992). Notably, the object of change can be policies, but it is perhaps more often different institutional arrangements.

For my analysis it is also especially important to relate to the important role of ideas and “policy paradigms”, which is often stressed by historical institutionalism. Hall uses the paradigm concept to describe “overarching ideas” that specify how the problems facing the policy makers are to be perceived, what goals might be attained through policy, and what sorts of techniques can be used to achieve those goals. One example is the highly coherent system of ideas connected to the economist John Maynard Keynes; to a great extent this policy paradigm structured the policy making activities and arrangements of British economic policy making for many decades. As with a scientific paradigm, a policy paradigm can be threatened by anomalies that are not comprehensible with the framework of the paradigm. According to Hall, a movement from one paradigm to another will involve “the accumulation of anomalies, experimentation with new forms of policy and policy failures that precipitate the locus of authority over policy and initiate a wider contest between competing paradigms” (Hall 1993). Borrás and Lundvall have, based on Hall’s notion, described the development in research and technology policy during the 1990s in terms of the emergence of a new “innovation paradigm”. The point here is that it is not only “policies and tools” that have changed but also policy aims and the conception of what is considered a problem worth solving (Borrás and Lundvall 1997).

One of Hall’s main points is that while normal policy making happens within an existing policy paradigm, atypical change is often accompanied by changes in the policy paradigm. This latter type of change is usually also the consequence of external crisis, radical changes in the preferences of the actors in the subsystem, or radical institutional changes. Hence atypical policy changes are largely triggered by factors outside the policy subsystem. Changes in policy instruments and the precise use of them are, according to Hall, processes that evolve within a given paradigm, although, in theory at least, when a paradigm shift occurs, the types of instruments considered as plausible will also change. An important question is how the development of policy varies across different types of policy areas. Hall points out that the degree of elaboration and forcefulness naturally will vary between policy areas. It seems, according to Hall, reasonable that more elaborated paradigms will be found in areas where highly technical

issues are involved, in institutional settings dominated by experts or “administrators with long tenure in office” (Hall 1993).

John Campbell has argued that the conceptualization of ideas among researchers in the historical institutionalist tradition is not very sophisticated. He states that they tend to neglect that ideas not only constrain, but also facilitate political action especially in how actors deliberately “package” and “frame” policy ideas to convince others about the viability of new solutions. Combining the historical institutional perspective, with elements of sociological institutionalism, Campbell argues for a more elaborate conceptualization of policy ideas, based on two dimensions: firstly, whether the ideas are focused on a normative or cognitive level; secondly whether they can be characterized as being on the foreground of the policy debate or as underlying assumptions in the background. By combining these dimensions he defines four types of ideas: paradigms, public sentiments, programs and frames. *Paradigms* reflects Hall’s concept, referring to cognitive background assumptions, whereas *public sentiments* are more normative background assumptions about what the public perceives as legitimate and acceptable public actions. On a more practical level, in the foreground of the public debate, Campbell distinguishes between *programs*, which are concepts and theories working on a cognitive level, giving concrete prescriptions for policy action, and frames, which are normative concepts used by policy makers and other elites to create legitimacy for different policy solutions (Campbell 1998).

### **The policy legacy: Swedish technology policy from the 1940s to the 1990s**

In this section I will present an overview of technology policy development in Sweden from the 1960s to the 1990s, in order to describe the policy legacy of the new innovation policy, and what I interpret as important “formative moments”, influencing the formulation and implementation of the later innovation policy. I will present both the main goals and ideas behind technology policies, and their relation to more “general” industrial and research policies. In addition, I will also discuss in more detail the development of the implementation structure and policy instruments of the main technology policy agency (STU, later NUTEK), since I will argue that the development of this technology policy bureaucracy and some of its instruments, was particularly important for the later changes towards a new innovation policy.

Even though several technology policy instruments were launched already during the first half of the 20<sup>th</sup> century, the first major technology policy initiatives in Sweden can be traced to a



number of institutional arrangements that were set up primarily during the 1940s. The most important of these was the inauguration of Swedish Technical Research Council (TFR) in 1942. This was, in fact, the first governmental agency of this type mainly supporting R&D financially but also assuming an overall responsibility for the development of technical research, taking new research initiatives, and spreading research results. As pointed out by Torsten Nybom (1997) this was in a way a formative moment for research and technology policy. Instead of directly supporting specific research institutes, the government chose to channel the funding through a council, which also meant that the resources were directed primarily to existing researchers already employed at the universities (Nybom 1997). Other important initiatives, although not as important financially as TFR, were a number of branch research institutes established through agreements between the government and different branch organisations, and the creation of an office for supporting inventions (Marklund 1994).

These institutional changes can be related to an increasing cooperation between the state and industry in many areas, usually connected to the strengthening of corporatist structures for governance of the economy during the 1930s and 1940s. In the case of technical research industry, and organisations representing it, were to a large extent the active partners. In contrast to other more dirigist ideas of state intervention in the economy discussed at the time, research issues primarily involved advantages for industry, primarily risk-sharing. From the state perspective, primarily the leading governing party at the time the Social Democrats, technical research policy was in line with ideas about how to rationalise and make the industry more effective, but could also, for some, be seen as a step towards a larger state influence over industrial development (Benner 1997; Lewin 1967; Nybom 1997). Obviously, the economic turmoil of the 1930s and the war can also be seen as typical opportunities, or “openings”, for more radical policy change.

The second major policy change in this area was related to the so called industrial policy offensive in the late 1960s and early 1970s. The industrial offensive, launched as an important “ideological project” by the social democratic government of the time, focused on, among other things, the importance of government intervention for technical development and innovation. Important organisational initiatives were the establishment of a new Ministry of Industry, a state owned Swedish Development Company, the Swedish Investment bank, and the Swedish National Board for Technical Development (STU), which took over the role of TFR and a number of other

organisations created in the 1960s, in 1968. In addition to deriving from ideological motives and political strategies, the motives behind the establishment of STU, which in practice became the main technology policy implementation organisation, also included obtaining a stronger overview of the policy process. The creation of STU was also inspired by new ideas about the importance of technical research for economic growth, an issue that met with lively debate during the 1960s (Glimell 1986; Sandström 2000; Weinberger 1997).

The establishment of STU can also be seen as an expression of the sectoral principle that dominated Swedish R&D funding until the 1980s. Research was first and foremost viewed as an instrument to achieve political goals, not a political area in itself. Most ministries had different sectoral agencies that handled research funding and established priorities in close relationships with sectoral interests (Stevrin 1978).<sup>6</sup> STU was in this perspective supposed to be responsible for R&D of relevance for industrial policy. The overall Swedish industrial policy during this period and further on, at least until the mid 1980s, was to a large extent focused on “correcting market failure”, to use economists’ terminology. Bromander and Loxbo state that the goal of industrial policy was to make the market more “civilised, disciplined and effective” (Bromander and Loxbo 2004). According to Göran Marklund, the formal motives behind more explicit technology policy initiatives in governmental bills during the 1970s and 1980s were, however, rather complex. Some formal motives could be referred to ideas of market failure, but the motives were also related to ideas about the importance of technology for economic growth, and about the importance of new technology for small states’ capability to survive on a competitive global market. Many motives were also related to projects of “national” importance, for example concerning defence, atomic and space technology (Marklund 1994). In practice, Swedish technology policy developed in a balanced relationship with a rather small number of Swedish R&D intensive companies, and the business or private sector share of Swedish R&D (which during the whole period studied here has been one of the largest in the world, counting per capita)

---

<sup>6</sup> Exaggerating somewhat, one could argue that the policy was to “have no substantial policy” in a given area. What makes this a policy, from a policy studies perspective, is the strong intentions connected to the sectorial principle on a general political level. As argued by Heclo, Heidemheimer and Adamams: “Government inaction, or non-decision, becomes a policy when it is pursued over time in a fairly consistent way against pressure to the contrary” Heidenhemier, A., Heclo, H., & Adams, C. T. (1990). *Comparative public policy: the politics of social choice*. New York: Macmillan.

has oscillated between 65 and 75 % until the present day. During the later part of the 1970s, industrial policy had to deal with severe national economic problems, which led to new organisational initiatives of relevance to technology policy, such as the creation of an Industrial fund for support to “later stages in the innovation process” (Marklund 1994).

Within the framework of the industrial policy STU was the main instrument for Swedish technology policy, although conflicting ideas of what the organisation should do led to turbulence and to some extent “paralysed” the organisation until these problems were solved. Eventually the agency was partly restructured in the late 1970s (Weinberger 1997). The major instruments for the agency were funding for single projects, both research and development, sometimes through grants, and sometimes (in the case of development funding) through loans with low interest. Another important instrument was also support to collaborative programs at the industrial institutes (Weinberger 1997). But the agency also developed other instruments for example, advisory functions, information campaigns and, during one period, also a function for technology procurement. Overall, the STU at this time can be characterized as a relatively flexible organisation with a large number of items in its “tool box” (Marklund 1994). STU was also involved in one of the largest civil research programmes in Swedish history, the Energy research programme that was launched in 1975, as a reaction to the energy crisis. The programme can be seen as an expression of the optimistic view on, based on public administrative ideas about programme budgeting etc., that research could be steered towards socially desirable goals (Wittrock and Lindström 1984).

Although the main instruments of technology policy during the 1970s and 1980s were handled by STU, the government also created other structures that were relevant for innovation in a more general sense for example, the regional development funds (merged into ALMI in the 1990s) to give support primarily to small and medium sized companies (SMEs), and the Industrial Fund, a foundation that focused on loans to companies (first and foremost SMEs) in early stages of the innovation process. The mostly selective orientation of Swedish innovation policy in its choice of instruments during this time period can also be contrasted to the establishment of a tax credit for R&D in 1970. The goal of this policy measure, in line with the arguments of the industrial policy offensive mentioned earlier, was to stimulate the development and restructuring of Swedish industry. The system was strengthened and specified in 1973 to make it more oriented toward technical research, and in 1981 it was made permanent. Although the right-wing political parties

in power at that time were rather eager proponents of the tax deduction scheme, the social democrats were dubious, and when the social democrats regained power in 1982 they decided to abolish the scheme. The short use of this instrument can partly be seen as reflecting a conflict of basic ideas on technology policy: the social democrats argued for selective interventions, whereas non-selective instruments were more in line with the focus of the right wing parties on general conditions for growth. If we look more closely at the arguments of the parties, however, this interpretation can be questioned. The social democrats actually argued that the instrument was only apparently non-selective; due to its specifications and complicated set-up, it only benefited the big companies with already high levels of R&D (Sandgren 2004).

The political ambitions of the early 1970s soon faded away, and the industrial policy of the late 1970s and 1980s, during both right-wing and social democratic governments, became more “reactive”, partly responding to crisis in many Swedish industries. A few important initiatives were taken for example, the launching of the National Programme for Microelectronics, in 1983. This initiative was, however, not primarily an expression of any active political project. The idea was a result of discussion between STU, and its network of industry and research representatives, and the Swedish defence purchasing authority (FMV) (Benner 1997).

In the 1980s the Swedish Government developed a more co-ordinated research policy, as a complement to, but also challenging, the overall sectoral research policy (Premfors 1986). This new research policy also channelled a specific criticism of the organisation of the sectorial agencies, originating from the scientific community.<sup>7</sup> This specific part of the policy meant that the sectoral research agencies had to deal with new tasks and objectives. Supported by representatives of the scientific community, the Government challenged the agencies to develop procedures of governance whereby the scientific community had a larger influence, and according to which scientific quality was to be the primary criterion when evaluating project proposals. Hence, essential parts of the ideas and procedures of the sectoral agencies were questioned (Persson 2001).

Partly in line with the development of the research policy, STU tried at the beginning of the 1980s to develop more long term oriented grants for R&D funding, which led among other things

---

<sup>7</sup> The criticism of sectoral research was, not the least, triggered by the perceived failure of the energy research programme (see above).

to the development of so called framework programs and mission-oriented areas. While both types of programs were focused on close collaboration with representatives of industry and the scientific community, the framework program eventually enjoyed greater longevity. The framework program as a policy instrument was based on a number of components. The primary idea with the program was to provide financial support for research within “distinct but relatively broad/encompassing problem areas” over a relatively long time period (5-10 years). Each program was supposed to involve a number of different disciplines and research groups at different universities and research institutes. The programs were set up, and the problem areas framed, in a negotiation process between university researchers and STU, that to some extent also involved representatives from the industrial community. Important steering mechanisms were a scientific committee that advised STU on the steering of the programs, and regular “peer review” evaluations that worked as control instruments and, perhaps even more importantly, instruments for negotiation and legitimacy. The framework program can be described as a rather “clever” implementation strategy to involve university researchers in dealing with what STU perceived as industry-relevant problems. In this respect it was also rather typical of the choices of policy instrument made by STU (See Weinberger 1997 and Persson 2001). STU, and later NUTEK (see below) also became an important facilitator of new academic ideas about how to understand the innovation process for example, by supporting academic research about innovation, but also through interactive activities and building up expertise in the area (Eklund 2007; Weinberger 1997).

In the late 1980s and early 1990s Swedish industrial policy shifted quite markedly. The background was a change in the general view of industrial policy, a stronger emphasis on liberalization of the market, deregulation of the credit market, etc. Even though the process had already started already during the social democratic government, it accelerated during the right-wing government of Carl Bildt in 1991-94. The right-wing government re-focused industrial policy on deregulation, privatization of public companies, and support for the creation of new companies (NUTEK 1993). Swedish membership in the European Market in 1994 also led to consequences for the possibilities for providing financial support to industries. While support for restructuring industries was basically abolished in the early 1990s, one of the only instruments of industrial support that was left for the government was support for R&D (which was accepted within the framework of the competition regulations of the EU). An important decision

influencing technology policy was the creation by the government of a number of foundations for funding for research and university-industry relations in 1993 and 1994.<sup>8</sup> Of primary importance for technology policy were the creation of the Swedish Foundation for Strategic Research (SSF), with the goal of supporting “strategic research”, and the Foundation for Knowledge and Competence (KKS), and seven regional so-called “Technology Bridge Foundations” for innovation loans, that were set up to strengthen by different means collaboration between university and industry, and the commercialisation of research results. The focus of SSF became primarily support to so called strategic research; much in line with the earlier initiatives of NUTEK in, for example, the Materials Consortia Programme (see below) (Benner 2001).

During this period the organization for implementing technology policy undergone several changes. In 1990 a new technical research council, more oriented towards supporting basic oriented technical research, was set up, partly by transferring funds from STU. Furthermore, in 1991 STU was merged with the Agency for Industrial Development (Industriverket), and the Energy Agency to create the Swedish National Board for Technical and Industrial development (NUTEK). The consequence of these organizational reforms was a clearer “division of labour” between basic and applied research a policy development that was even further institutionalized through reforms of research funding organization in the late 1990s.

The early years of the 1990s were also characterized by the creation of policy instruments with a strong focus on collaboration and co-funding of research. For example, in the end of the 1980s STU, in collaboration with the Natural Science Research Council (NFR), developed so called Material Consortia. As the framework programs, the consortia were set up over longer time periods and were to be regularly evaluated. But the consortia were not clearly directed by STU; each consortium was led/managed by a professor, and usually involved several research groups (Persson 2001). One initiative, which eventually became the “flagship” of NUTEK, was the establishment of the Competence Centre programme in 1995. The idea of the programme was to establish research environments at the universities with the active support of, and in active collaboration with, industry. In total, about 30 competence centres were given a generous and long term (10 years) funding. It was in many respects a continuation of the experiences of the

---

<sup>8</sup> The reform was made possible due to the right-wing governments abolishment of the so-called Wage Earners. These funds were created a decade earlier by the Social Democratic government to increase the wage-earners influence over industrial production.

consortia programme, but a stronger emphasis was put on funding and collaboration with industry and the home university of each centre (which was mandatory). As in the materials consortia programme, specific efforts were made to create “leadership training” for managers of the centres, and the programme was also continuously evaluated, as in earlier “flagship programs” of STU/NUTEK, not only by international peer reviews, but also by impact evaluations (VINNOVA 2004). Both the consortia programme and the competence centre programs were inspired by similar programs in the US.

During this turbulent period NUTEK came to be even more oriented towards the business community. The presence of new actors funding strategic research, had the consequence that NUTEK focused even more on programs co-funded by industry partly to get closer to industrial needs, and partly to increase the actual resources available by convincing industry to invest money (Persson 2001). Like its predecessor STU, NUTEK had also a few other programmes, for example, supporting SMEs and commercialisation of research, but the more comprehensive R&D-programmes now became the main instruments of financial support. The co-funding strategy, which was more or less institutionalised in NUTEK during this period, not least through the competence centre programme, was probably also important as a survival strategy for the agency. It became a way to strengthen NUTEK:s mission and make it even more explicit (Winqvist 2000).

When the social democratic government returned into power in 1994, in a period of a deep economic recession, the issue of the universities’ role in economic and technological development turned up on the political agenda. The pressure increased for new instruments to enlarge the contacts between universities and the rest of society. For a quite long period of time, the universities had had a so called “third task” of communication with society as a complement to their traditional tasks of education and research. Partly based on an investigation commissioned by the Ministry of Industry, this role was now regulated more in detail, and the political pressure universities and university researchers to strengthen their ties to societal, and primarily industrial objectives, were more forcefully articulated. This development was to some extent a consequence of the deep economic crisis that Swedish economy suffered during the mid 1990s, but also a consequence of a strongly expressed “political agenda” by the social democratic minister of education. Ideas implying a more “needs-oriented” perspective on research

temporarily acquired a stronger position in research making than they had previously (Benner 2001).

Apart from R&D funding, the industrial policy of the Social Democratic government during the second half of the 1990s was very much focused on the development of a new “growth policy”, which aimed primarily to encourage regional growth through so called regional growth programmes that were introduced in the late 1990s. The programme was a blend of regional and industrial policy; a softer way of making industrial policy, which left it to actors on the regional level to develop regional growth agreements. These initiatives could also be interpreted as an effort to formulate a more horizontal policy process, trying to co-ordinate several policy areas and integrating several ministries towards a general goal. In line with this development, the government also merged the ministries of Industry, Labour Market and Communications and transport into one “super ministry”. Even if the motive for this reform was also to cut administrative costs, it was still supposed to make the handling of growth issues easier to coordinate (Persson 2003). In practice, the integration process proved difficult, and the very general growth policy was hard to implement (see for example Pierre 2004).

Overall the 1990s was however characterized by more generally oriented policies than before, at least within the area of industrial policy. Instruments of a more selective character; implying stronger intervention in the market economy, were not in fashion, and to some extent also made more difficult through EU competition regulations. As suggested by the economic historian Magnus Eklund (2007) this is probably important reasons why new policy proposals in line with a system of innovation perspective, presented by some researchers and experts in the area and meeting some political attention, had difficulties in generating any concrete results. Proposals suggesting a more active use of technology procurement, possibly inspired by new ideas about innovations systems, were for example turned down (SOU 1997:88).

What can we conclude of this rather long period of policy change in Sweden? The technology policy development in Sweden has been, I would argue, structured around three “formative moments”, each involving more radical policy change. These moments occurred in the mid-1940s, in the late 1960s, and in the early 1990s. Goals, including the ideas behind policy, institutional structures and policy instruments, were to varying degrees transformed during each of these periods. These were also periods characterized and driven by “political action” on the part of parties and interest groups, not least the governing party or coalition. The “frameworks”



for these more radical changes were, as theory would predict, also related to changes in the contexts of policy-making. In the early 1940s, the economic crisis and the world war were obviously important; the late 1960s were characterized by strong ideological expectations for governmental action, but also an economic slowdown; the early 1990s were characterized by an economic slowdown, and eventually a severe economic crisis. It is not clear cut if these radical changes of policy also included radical changes in the ideas influencing policy, although the changes in the late 1960s were definitely influenced by theories of technological change (on the conceptual level), and normative ideas about a strong role for the state. The changes in the 1990s were influenced by ideas about de-regulation and new public management (conceptual), as well as normative ideas about a more limited state. It is also interesting to note that developments in technology policy were closely related, and intersected with, developments in policy areas that usually receive more public attention: industrial policy and research policy. Thus changes in technology policy were partly “spill over effects” from these areas.

The development of more specific policies (programmes and instruments) in this area were closely related to the development of the governmental agency responsible for functioning as a “intermediary” between politicians and the industry and research community. This agency was first TFR, then STU, and finally NUTEK. Its bureaucratic structure was in fact the stable structure around which the technology policy area developed. Apart from implementing and experimenting with policy instruments what Hall’s would call “normal policy making” the agency also functioned as a node within a network of actors involved in formulating, channelling and “translating” new ideas (not least from the OECD) and arguing for technology policy change. The character of policies in this area has also been characterized by a corporatist tradition, emphasizing “collaboration” between state and industry, although the exact nature of the collaboration has varied greatly depending on prevailing ideas, economic and political conditions, etc.

### **A new Swedish innovation policy?**

As pointed out at the beginning, a number of initiatives were taken to formulate and implement an innovation policy during the late 1990s and early 2000s. Apparently, moreover, these measures were associated with the new innovation policy paradigm. In this section, I will present this rather recent policy development and try to analyse the character of policy change. During

the last seven years several policy initiatives have been taken that, more expressively than before, have been based on the new innovation paradigm. Even though they are closely interrelated, I will divide my description of the development into two separate processes: 1) the establishment and development of a new Swedish innovation agency, VINNOVA, and 2) the development of a governmental innovation policy strategy. The analysis will continue in the following section with a more theoretically informed discussion.

*The creation of VINNOVA: an organisational reform with discursive consequences*

The first discursive expression of the “new” Swedish innovation policy was the establishment of the Swedish Agency for Innovations Systems (VINNOVA) in 2000. The creation of this new agency can at least partly be seen as the result of a struggle about the direction of Swedish research policy that culminated in the late 1990s. In 1998 a governmental commission (called *Research 2000*) had proposed the abolishment of a number of governmental sectorial or applied research agencies and a stronger focus on basic research. The general principle of this investigation was that research funding should either be controlled by the research community (by universities themselves, or by research councils controlled by elected members of the research community) or by governmental agencies responsible for specific sectors and funding R&D for their own needs and activities. Specialized sectorial research funding agencies such as NUTEK or the Swedish Council for Building Research, which funded research and acted as representatives for the needs of industry or societal sectors, should be abolished. This third category constituted a “blurred” type of governance, where the criteria for funding research, according to the investigation, were unclear. The proposal, however, met strong resistance from many actors not least many industrial organisations, including industry-oriented unions, the so-called Industry committee<sup>9</sup>, and sectorial agencies such as NUTEK. The proposal also seemed too radical and focused too much on a university perspective for the Social Democratic government. The lack of support from the “industry policy coalition” also made the proposal politically almost impossible to implement. In the bill discussing the *Research 2000* proposal of

---

<sup>9</sup> The Industry Committee was created by the main employer organisations and unions in the industrial sector to oversee the implementation of the so-called “industry agreement”, an agreement about common practices concerning salaries and their connection to economic growth. The organisation has also been an active “lobby organisation” for a more active policy for growth and innovation (<http://www.industrikommitten.se>).

the government made it quite clear that the state also had to take responsibility for applied research of the kind supported by NUTEK (Benner 2001).

To come up with a more “realistic” proposal, the government therefore set up a working group under the auspices of the Ministry of Education. The proposal of the working group suggested a new Research Council, merging the existing research councils for basic research into a larger organisation with more “muscles”, but also proposed creating two new mission-oriented research funding councils, consisting of parts of a number of earlier sectorial research agencies and units. The new mission oriented agencies were, unlike their predecessors, organised along much the same lines as the research councils for basic research, thus reflecting strong influence by the research community for example, through the use of peer review in decisions about research grants. The investigation also presented a proposal for a new R&D agency for more needs-oriented research, mainly related to growth and industrial policy, but also connected to, for example, transport and infrastructure. The important point was that this organisation should have another organisational structure putting more emphasis on societal relevance (Ds 1999:68).

The proposal for a new R&D agency was developed in close collaboration with another investigation about the organisational structure of the industrial policy implementation organisation. This investigation had been set up as a “parallel investigation” to the working group with analysing the research funding system. Formally, the mission of the investigation was to analyse how the activities of industrial policy agencies of relevance to the Swedish innovation system could become more effective and contribute to a larger extent to economic growth and the development of society. This investigation also suggested a new “R&D agency”, but specified the ideas behind the agency by putting a stronger focus on its role in a innovation policy perspective, driven by explicit ideas about innovation and the development of industry and society. The proposals of the investigation were to a large extent inspired by the innovation and research policy of Finland. Among other things, the investigation proposed a ministerial committee for innovation and research, inspired by the Finnish Science and Technology Policy Council (Flodström 2000; Eklund 2007).

The proposal for a new agency for R&D was presented in a governmental bill to the parliament in the spring of 2000. The new agency was supposed to consist of parts of three sectorial agencies: the R&D-parts of NUTEK, RALF (The Council for Working Life Research) and KFB (an agency funding Transport and Communication Research). The objective was to

create one strong governmental agency to support research of industrial and societal relevance. The motives that were presented in the bill for establishing the new agency were mostly of an administrative kind: an agency with stronger financial “muscles” would make it easier to focus resources and to set priorities, and the merger of three agencies would also lead to savings of administrative costs. It was, however, also pointed out that the growing need for innovation-based economic growth had made co-operation between sectors and disciplines increasingly important something that the new agency would make it easier to accomplish (Prop. 1999/2000:81). The creation of the agency must also be seen in the light of a re-organisation of the whole central administration for industrial- and growth-policy that was proposed in a bill formulated by the Ministry of Industry earlier that spring (Prop. 1999/2000:71). The parliament’s decision followed the proposal by the government.

The focus of the new agency was further specified in the more comprehensive research bill that was presented in the autumn of 2000. Firstly, the government proposed that the new agency should be named The Swedish Agency for Innovation Systems, VINNOVA. The agency’s role was more or less described as it had been in the earlier decisions, but in this bill more emphasis was put on the role of innovations, innovations systems, and innovation policy. These terms were also defined and discussed, even though it was not explicitly stated that the government had formulated an innovation policy, distinct from research policy. The naming of the new agency had been handled during the spring by an organisation committee, and according to the member of the committee responsible for the R&D agency the coming director of VINNOVA, Per Eriksson, the intention was to follow the ideas of the investigation led by Anders Flodström (Eklund 2007). According to Olof Sandberg, who handled these issues at the Ministry of Industry, several names were considered, but the choice of innovation system was in line with “fashion”, more than anything else (Interview with Olof Sandberg). Secondly, the new agency was to a larger extent described in the context of industrial development and economic growth. Even if the role of the agency was still supposed to be to support research of relevance both for society and industry, the focus in this bill was to a larger extent on the latter, for example, through the focus on certain technology areas and collaboration with industry in sectorial R&D-programmes (Prop. 2000/2001:3).

The creation of VINNOVA can be interpreted as a discursive breakthrough for the system of innovation perspective, as argued by Magnus Eklund (2007). The adoption of the system of

innovation was, however, mainly a matter of strategic use of a concept according to Eklund. I would also argue, though, that this development was very much in line with interests and strategies of both an existing coalition around the new agency and “the relevant others”, primarily a number of industrial interest organisations, unions, and technical universities. In many ways, the ideas connected to the innovation paradigm were a way to organise for a more active industrial policy, argued for by this coalition. Although many actors had already in practice adopted the concepts of an innovation paradigm in the middle of the 1990s, the uses of the paradigm by this coalition, and its efforts to formulate practical policy, contributed to this “discursive breakthrough.

How has VINNOVA interpreted its mission, which is so closely related to the innovation paradigm? Firstly, it is important to point out that the new agency was composed of parts of three existing agencies, of which the “technology policy part” of NUTEK was the largest. The agency therefore came to be influenced by the past decisions, and cultures, of its predecessors, especially during the first years of existence. Secondly, the more specific objectives of the agency were to strengthen the knowledge bases of growth areas in Swedish economy, promote the development of strong research and innovation environments, work for more effective use of R&D, and act as an expert agency contributing to the development of an effective innovation policy in Sweden. The main role for VINNOVA was hence funding of applied research and somewhat strangely therefore the agency acquired a more limited mission than both its predecessors STU and NUTEK. VINNOVA has, however, been active in stretching the boundaries of its mission for example, by extensive collaboration with other agencies and by such means it has tried to broaden its role to that of a more “network-oriented” agency. The formulation of new visions and strategies were to some extent also inspired by the innovation policies in Finland (Persson 2008).

VINNOVA has been active in developing new initiatives to interpreting its role, but at the same time also strategically adapting to different policies and demands from the government. The initiative that attracted most attention was perhaps the “Regional growth for dynamic innovation systems programme” (VINNVÄXT), which was launched in 2001 as a way to implement regional development policy by supporting regional partnerships selected a “competition” procedure. The programme was explicitly inspired by ideas of innovation systems and triple helix relations, focusing on supporting collaborations among different types of societal actors, and using ambitious systems of monitoring and evaluation (Christensen et al. 2006). Other apparently

successful initiatives have been “Research and grow” (Forska och väx), funding R&D in small and mediums sized companies, and programmes related to specific industrial and labour policy needs. VINNOVA has also functioned as a “fixer” for the government, for example in the crisis in the vehicle industry and in problems concerning IT and risk capital (see above). The agency has been active in collaborating with other agencies, not only in research programmes, but also in industrial and labour market policy programmes. As will be stressed in the next section, the agency has also been active in lobbying for a stronger governmental innovation policy, and in trying to create alliances with other actors in the industrial policy arena.

It is hard to evaluate the “success” of a governmental agency, but there are many indicators that show that VINNOVA has been established as a strong agency in a quite short period of time. Notably, VINNOVA has had a strong budget development, which could be seen as an expression of confidence in the agency’s capacity and legitimacy. As will be noted in the next section, the more explicit innovation strategy of the Social Democratic government at the beginning of the new millennium played an important role for in the strengthening of VINNOVA’s position. This organisation, which from the beginning was almost an “anomaly” in the research system, seems to have achieved a strong role and position. The people interviewed have all stressed the importance of the general director for a “strong profile” and a general impression, based on different sources a strong legitimacy among researchers and representatives of industry, both of which the agency has developed over time. Even from the beginning, the management of the new agency found it important to define a clear role in relation to other actors, and to adopt and implement concepts such as innovation system and triple helix in the organisation. It is also noteworthy is that VINNOVA has been active in “constructing” its role in the area of innovation and research policy. VINNOVA thus present itself as a unique agency with a “high profile”:

VINNOVA is a state authority that aims to promote growth and prosperity throughout Sweden. We share this goal with many others, but the way to fulfil it is indeed our own (VINNOVA home page 2006).

The agency obviously intends to point out that that it has a very specific perspective and way of doing things that distinguishes it from other agencies. The agency has in fact as one of its objectives to work with a certain scientific perspective as the basis of decision making. VINNOVA points out that its way of working is based on “an integrated system of innovation

perspective” (Strategy of VINNOVA 2003), and that its working management practice are expressly inspired by the Triple Helix concept (meaning a strong focus on the importance of relationships between university, industry and the public sector). Although the use of social science knowledge in formulating policy was also present in the “old NUTEK” and STU, innovation concepts have been more explicitly used in the new organisation.<sup>10</sup> Another difference from the earlier programmes of NUTEK seems to be that the R&D programmes of VINNOVA are more streamlined than before; they follow a certain rationale or logic, for example, in that they are all motivated by and presented within, a narrative based on academic concepts such as “systems of innovation”, “Triple Helix”, and “cluster”. It is also often stressed that the programmes are set up after the agency has identified problems in the innovation system, in accordance with a system of innovation view on the policy developing process. The set-up of some programmes also points to a somewhat stronger role for network or system management than before.

The shift from old to new is, however, not clear-cut. Firstly, the usefulness of the new concept for the actual design of specific instruments has been difficult for VINNOVA management to communicate to actors addressed by or involved in VINNOVA programmes. Even the project managers at the agency, has in many cases been reluctant to adopt the new concepts or ambivalent about them. The decision making rationale of basing the design of new programmes on an analysis of the relevant system of innovation has not been applied systematically (Persson 2007). Obviously, the development varies depending on technology area, sector, etc., and it might take more time to implement new ideas in a new organisation, but the above observations still indicate that the new concepts have not provided the policy makers with a “clear and specific course of policy action”, in the wording of John Campbell (Campbell 1998).

Secondly, in many ways the activities of VINNOVA have continued on the same path as those of its predecessors, the “old” NUTEK and STU. The focus on strong research environments, such as VINN centres of excellence, is, for example, a more or less new version of earlier concepts such as material consortias and competence centres, although somewhat differently motivated and “framed”. The focus on co-funding, usually 50% demanded from industry or, in a few cases

---

<sup>10</sup> Although, as shown by Merle Jacob, the concepts are not used in the same way as in an “academic” context (Jacob 2006).

the public sector, was a general rule, with exceptions, that was established already during the NUTEK-period (see above). The difference from before is often claimed to be that VINNOVA, in accordance with a triple helix view on the innovation process, also includes funding from the public sector but this is probably partly a consequence of the fact that VINNOVA, unlike NUTEK, is also responsible for “softer” areas such as part of the working life research sector. It is, however, obvious that many of the programs for example, concerning sectorial innovations systems are not new, but successors of earlier, and similar, programs, although the rationales are now expressed in a new way. According to interviews with programme managers at VINNOVA, the use of innovation systems analysis has also been more complicated than originally expected, which has led to a more practical view on initiatives for new programmes. It is also interesting to note that openness and competition, for example, through specific time-limited calls have become the rule of funding R&D. In fact, this seems to be a long term trend; the scope for initiatives outside the formal calls (bottom up initiatives) has decreased over time (Winqvist 2001).

Even though VINNOVA and some of its programmes present the most explicit practical expression and implementation of new innovation policies, it is also obvious that the new innovation policy ideas have also influenced other choices of policies and instruments. One example, referred to in the previous section, is the cluster programmes of the “new” NUTEK (now responsible for business support), which has explicitly referred to new ideas about regional innovations systems and clusters. NUTEK has also been active in designing programmes for entrepreneurship. The same holds for agencies such as ALMI, which is responsible for subsidies and funding for small and mediums sized companies. On the whole, however, the changes seems to be primarily additions to existing activities, rather than radical changes to the whole set of activities, for those agencies.

#### *A formulation of an innovation policy: a political strategy?*

In parallel and interplay with the establishment and activities of VINNOVA, the government took a number of decisions that which it eventually packaged as a “new innovation policy”. The earlier decisions to create VINNOVA, was obviously a first step in this direction, but in that case the intention was not explicitly to create a new innovation policy. However in the bill “R&D and co-operation in the innovation system” presented in the fall of 2001, the concepts of “innovation policy” and “innovation system” formed the framework for discussion. The bill, drafted in the



Ministry of Industry, formulating the basis for a Swedish innovation policy as “a tool to enable an effective innovation system” mainly by instruments of co-ordination and collaboration among different actors. Somewhat oddly, though, it constrained the role of government in the innovation system to the support of mission-oriented research. In this bill, the government focused on three changes concerning mission-oriented research within the Swedish innovation system. Firstly, new resources were allocated to the Swedish Governmental Agency for Innovation Systems, VINNOVA. Secondly a new organization to strengthen the industry-oriented institutes was presented. The state should, through VINNOVA and in cooperation with the Foundation for Competence, strengthen competence building at the Universities. Thirdly, the bill increased funding for holding companies at the universities, and a further number of universities were given the opportunity to create holding companies.<sup>11</sup> The importance of straightening up the rules concerning patents and the specific intellectual property rules at universities i.e. the so called Teacher exemption clause (“Läraryrket”), which gives academic staff at universities full entitlement to any intellectual property arising from their research, was also discussed. Many actors, for example in the business sector, had argued that this regulation should be abolished, in order to strengthen the universities role in, and incentives for commercialization, but the government argued that other actions it had proposed to strengthen commercialization at the universities should be sufficient (Prop. 2001/02:2).

Although the focus on innovation policy in the bill was partly a way of “packaging” rather than a strong political statement, the government – surely influenced to a large extent by the rhetoric around the creation of VINNOVA – seemed to have been inclined to formulate a more fully articulated innovation policy at the turn of the millennium. One immediate reason for this was the development of Swedish industry: the IT-sector was in crisis and, in particular, the Swedish flagship in mobile telephony, Ericsson, had major economic problems. Issues such as slow growth and the movement of Swedish companies abroad were on the agenda. One important initiative was the “The future for Swedish industry” strategy, a result of collaboration among representatives of a number of industry-specific unions and industries, but also other actors, including two influential members of the executive committee in the Social Democratic party.

---

<sup>11</sup> The role of such a holding company was to be a “holder” of development projects and commissioned education etc. at the university.

One of the initiators to the work was the industrialist Carl Bennet, and the group behind it was therefore named the “Bennet group”. They argued for a number of initiatives in certain key sectors of the Swedish economy, particularly through collaborative programs focusing on R&D and competence building. The strategy also included a number of initiatives for strengthening the “Swedish innovation system” for example, an incubator program, measures strengthening for industrially oriented research, and risk capital (The Future of Swedish Industry, 2002). Soon after the strategy was published the Prime Minister, the Minister of Finance and the Chairman of the Trade Unions, declared in a debate article that they were “prepared to assign new funding to the proposals by the “Bennet group” (Persson, Ringholm & Lundby- Wedin 2002).<sup>12</sup> The Ministers of Industry and Education also took several common initiatives to argue through the media for more horizontal policy-making in this area, integrating parts of research and industrial policy into a “coherent innovation policy” (see, for example Rosengren and Östros 2002). Obviously these initiatives were strongly triggered by the upcoming election; the formulation of an innovation policy thus partly functioned as a strategy for the Social Democrats to show that they were capable of dealing with these issues in the future.

The stronger formulation of innovation policy on a political level was naturally embraced and supported by VINNOVA; this development was very much in line with the “mission” of the new agency. During its first year the agency had been very active in arguing for a more comprehensive innovation policy, and in many documents it had pointed to the weak capacity for coordination in the Swedish government (see for example VINNOVA 2003). The agency also saw its role as that of spreading knowledge about the systems of innovation perspective, partly as a consequence of policy activities connected to the OECD and the EU. In some VINNOVA documents the acceptance of the concept in the Swedish innovation and research policy network was described in a deterministic manner, as just a matter of time (See for example Granat Thorslund et al 2005).

After the election of 2002 the “growth issue” remained on the agenda, and the government took initiatives to develop new ideas on the issue (Gergils 2006). It is also reasonable to think that since the more “general” growth talks with industry, which started in 2003, at least partly

---

<sup>12</sup> This message was also strongly emphasized and elaborated in the Prime Minister’s traditional election speech in Björkvik, outside Katrineholm, in August 2002 (Persson 2002).

failed to yield any concrete results (Fichtelius 2007), the innovation issues became relatively more important. Obviously, the Lisbon strategy of the EU, emphasising the role of research and innovation for economic growth, also triggered action within this area. An outcome of this process was the *Innovative Sweden* strategy that was presented in 2004. The strategy was a product of a working group composed of members from the Ministry of Industry, Employment and Communications (Näringsdepartementet), the Ministry of Education and Research (Utbildningsdepartementet), and the Ministry of Foreign Affairs (Utrikesdepartementet). In the introduction, the two ministers responsible for the document, the Minister of Industry and the Minister of Education, described the document as dealing with long term growth issues. It should be seen as part of the “growth policy” of the government. The general objective of the strategy was to create a good “climate for innovation”. Sweden was described in this document as a country with a number of advantages concerning innovation for example very high R&D spending, a high level of education, increasing direct investments, use of IT etc. It was also pointed out that Sweden was standing before a number of challenges for example, the globalization of the economy, the increasing importance of knowledge for economic development, increasing demands for sustainable development, an increasing part of the population in retirement, and a more complex system for steering society due to new relations among international, national, and regional levels of government. It was stressed that these problems had to be dealt with through co-operation with other interests and organizations.

The strategy was focused on four areas, with different instruments and activities: Knowledge Base for Innovation, Innovative Business Environment; Innovative Public Investments, and Innovative People. The proposals that were more narrowly connected to innovation, according to the definition used here, were:

- Strengthening the industrial research institutes as important complements to universities and colleges.
- Concentrating resources on strategic areas of research
- Providing incentives for increased cooperation among research, industry, and the public sector
- Providing incentives for increased cooperation between smaller and larger companies, primarily to enhance the capabilities of the smaller companies.

- Stimulating R&D investments by small and medium-sized companies
- Developing support for product development and design
- Developing the system for patents and other immaterial rights

The Innovative Sweden strategy is interesting since it represented an effort to integrate research policy with innovation policy, and even establish a new policy area. The approach was very broad, including a large number of policy areas, mainly industrial policy, research policy, education policy, communication policy, and trade policy. But to what extent did the document actually achieve integration? Three of the areas addressed, more or less, representations of the traditional sectors: education and research policy, industrial policy and policy regarding the public sector. The fourth sector was to a larger extent “intersectorial”, but was also very “fluffy” in its substance. In this sense it was not so much a matter of a new policy area, but rather a new way of packaging interrelated policy proposals from different existing policy areas. The understanding of what innovation policy is, or should be, also seemed to vary a lot among different actors in the ministries, something which pointed to problems of coordination (Granat Thorslund et al. 2005).

The strategy could however, also be interpreted as a discursive effort to establish a new way of thinking. A number of new concepts were presented as for example, systems of innovation, cluster, and triple helix. There was a strong focus on “soft” aspects and policy instruments, such as the importance of attitudes, a good climate for innovation, cooperation, building of networks, and social capital. Some aspects also reflected a more New Public Management (NPM)-oriented view of policy: for example, a focus on the priority of strong research and innovation environments. It is also important to point out that the strategy was primarily the result of an initiative from the Ministry of Industry and in that way partly reflected an intent to formulate a clearer industry-oriented policy concerning R&D issues (Interview with Olof Sandberg).

During the following two years the Social Democratic government also took a number of initiatives that were in line with the new innovation strategy. In the fall of 2004, an innovation policy advisory council was set up with the Minister of Industrial affairs as the chairman. The idea was to establish a closer dialogue with business and research representatives in this area, different from the more narrow “research-oriented” dialogue in the research advisory committee connected to the Ministry of Education (Prop 2004/05:80). It is also quite reasonable to think that

this new committee was formed in response to proposals (brought up, for example, in the investigation by Anders Flodström) to imitate an organization of the “Finnish miracle”: the Science and Technology Advisory Council”. There were, however, several differences: the membership of the Swedish advisory council was ad hoc, whereas the Finnish council consisted of standing members, with the Prime Minister as the chairman and other important ministers as members. The comparison reflects different policy making systems: a Finnish system characterized by strong consensus at the cabinet level versus a Swedish system which has primarily been characterized by consensus within parliamentary committees and in public agencies.

The main concrete result of this “new innovation policy offensive” was clearly the negotiations with representatives of sectors, to strengthen R&D and industrial renewal in “key sectors” of the Swedish economy, that were initiated by the Swedish government in 2004. The trigger for this development was partly the crisis of the vehicle industry in Western Sweden. To strengthen the competitiveness of the companies, the government took a number of initiatives, including new programs for vehicle related research, co-funded and steered in cooperation with the major companies in the sector. One result of these negotiations was the initiation of Collaborative Programmes for R&D, involving the state and major businesses within each sector. Such programs were set up in both the aircraft industry and the vehicle industry. Even though the contribution of funding was quite impressive, the concept was hardly new: the collaborative programmes collaborations were in reality continuations of similar programmes that were already set up in the middle of the 1990s. The initiatives in the vehicle industry were thus in reality a part of a reactive “crisis” policy to handle restructuring of the foreign-owned Swedish car industry in the Western part of Sweden. However, the concept also came to be used for similar initiatives, but for less acute reasons, in other sectors, such as the forest sector and the pharmaceutical industry. In the research bill of 2005, the government proposed to allocate 120 million Swedish crowns to implement such R&D programmes together with industry (Prop 2004/05:80). The Industry Minister at the time, Tomas Östros, describes the concept as a great success, not least since it won strong acceptance from major Swedish industries (Interview with Tomas Östros).

Another “innovation policy issue” that had been on the agenda for a long time, but became acute in the beginning of the new century, was the provision of risk capital and commercialization of new ideas. Because of the IT-crisis and the concomitant crisis of the

Ericsson, many actors on the capital market were cautious. The state's provision of risk capital was also to decrease dramatically, due to the fact that NUTEKs funding for this purpose was cut back in 2004. Furthermore, the Technology Bridge foundations were, according to the decision to create them in 1994, to be abolished later in 2004 and would have to "pay back" the initial founding capital of one billion Swedish crowns. In 2002, the government took the initiative to negotiations with relevant actors to try to solve this problem. The eventual result was eventually that the seven Technology Bridge foundations were not abolished but amalgamated into a new company called The Innovation Bridge. The Innovation Bridge also received new funding from the state-owned Industrial Fund, and took responsibility for the Incubator Programme, which earlier on had been handled by VINNOVA (see below). The new company was also to collaborate with ALMI, which is responsible for subsidies and funding for small and medium sized companies, but which now also acquired a specific task to fund innovation projects (de Neergaard 2004; Gergils 2006). The government also gave VINNOVA a mission to come up with proposals to strengthen IT research.

The government also adopted ideas and instruments connected to the innovation paradigm in policies concerning regional development and support to SMEs. In a bill on regional development and growth presented to the parliament in 2001, the government to a large extent adopted the rhetoric of the innovation systems approach, arguing that regional development policy should be driven to a larger extent by an innovation system perspective. It also proposed a new programme for development of innovation systems and clusters, and also presented proposals in line with these ideas. The programme was to be a complement to the already existing regional growth agreements, but more related to the new ideas of clusters and innovations systems (Prop 2001/02:4). The government had several times emphasised the importance of innovations in small and medium sized companies, and efforts were now made to strengthened support to this group of companies. For example, in the budget bill of 2005 the Government presented two proposals in this direction: A tax deduction for investments in R&D for small and medium-sized companies, and a special grant to NUTEK for support to industrial development centres, mainly directed towards smaller companies. Interestingly, the proposal for a tax deduction, originally proposed by one of the Social Democratic governments' coalition partners, the Environmental party, was exchanged for a VINNOVA-initiative to support SME:s (Forska och Väx) (Interview with Olof Sandberg).

In the research bill of 2005, the government also continued to emphasize issues concerning commercialization of research results. As in the bill of 2001, the government focused on the discussion about the “teachers exemption”, the universities plans to commercialize research results and expedite technology transfer, and the role of the holding companies at the universities (prop. 2004/05:80). The governments proposals in these areas were, however, more cautious than before which wasn’t especially surprising, since changes in these areas were regulative, and closely related to the steering of the universities. Governance of higher education was traditionally an education or science policy issue: making the commercialisation of university research a typical example of an multilevel issue. The then Minister of Industry, and earlier Minister of Education and Research, who seems to have been the central person in both the research policy and innovation policy areas in the Social Democratic government from 1998 to 2004, also showed a certain ambivalence on the most delicate of these issues, the handling of the teachers exemption regulation (Interview with Thomas Östros).

Regardless of these innovation policy initiatives, there continued to be a strong dissatisfaction among many actors in this area. The major critique seems to concern the lack of political steering. Recurrent proposal for reform include, for example, an innovation (and research) policy council led by the prime minister (inspired by the “Finnish model”), a closer institutional integration of different areas primarily in the Governments Office, and a stronger focus on “needs oriented” or technical research. As pointed out above, VINNOVA has been an active proponent of this perspective, but other agencies and experts have also been active lobbying for policy change (see for example (Bergström 2006; Gergils 2006).

### **Analysis: ideas, interests and policy feed backs**

What can we then conclude about the new Swedish innovation policy that developed during the last decade? Are there radical changes compared to earlier period of technology policy? The creation of VINNOVA and the formulation of a governmental innovation policy, connected with a number of other initiatives, are obvious changes. The question, though, is how much of this can be interpreted as a “radical shift”? What is clear is that, during a period of time, there has been a stronger ambition among policy makers to formulate a policy connected to innovation that is both more explicit and partly also adopts a “broader” perspective than earlier policies. Apart from policy ambitions and “the framing” of proposals, most policy changes have, however, been on

the level of policy instruments: In VINNOVA, and also in other governmental agencies, new instruments have been added to the existing “tool box” and old programmes have also been reframed to fit into a new context. The changes, I would argue, are so far at least partly described using Kathleen Thelen’s concept of ‘layering’ processes: new layers are added on to an existing structure. Goals and instruments have changed incrementally, but not in any radical way. On the other hand, there is also a matter of a new discourse being used, the effects of which are, at least in the short term, hard to measure. Here, the establishment of VINNOVA, and the connotations of the naming of the agency might have a long lasting effect, and partly unintended consequences. The future for initiatives related to the “innovation paradigm” is currently hard to predict. In 2006, the Social Democratic government lost the parliamentary elections, and a right-centre party coalition, in many ways more sceptical towards interventionist innovation policy, gained power.

How then can we understand the evolution of Swedish innovation policy around the turn of the new century? What factors have shaped its development? Using the historical institutional perspective as an overall analytical framework, I will discuss some important factors that, I would argue, have shaped the redefinition of Swedish innovation policy around the turn of the century, but also the development of Swedish technology and innovation policy more generally.

Is it obvious that new *ideas* have shaped policy action in this area, but how? To be more specific: how was policy development related to the “new” ideas about innovation processes? Firstly, it seems clear that the use of new ideas cannot be interpreted as a paradigmatic change in how policy is made in this field; rather, the innovation paradigm is one of several in a rather “fuzzy” policy field. The ideas “constituting” the innovation paradigm obviously appear important for how policy has been formulated, but at the same time they are not as clear-cut as, for example, the ideas of Keynes in the case of economic policy change. They have, however, clearly played the role of presenting “anomalies” and identified problems that the dominant theories underpinning policies cannot explain. In a more general way, they have challenged theories of economic growth and development. One example from the Swedish context is the reasoning around the so called “Swedish paradox: despite high investments in R&D, Sweden is claimed to have a low output when it comes to innovations. Regardless of whether or not everyone would agree with the existence, or the possible implications, of the paradox, it has obviously played an important role in “framing” the policy discussion.



It is furthermore obvious that new ideas and concepts connected to the innovation paradigm have influenced, in a practical way, the development of new policy initiatives in the area, especially on a more practical programme level. New concepts, such as system of innovation and triple helix, have been frequently used to “frame” or give structure to argument and proposals connected to innovation. These concepts thus seem to have been useful as tools to mobilise actors for a common project, not least within the “industrial policy network”, pointing to a strategic use of ideas. Finally, we can also hypothesize that the conclusions and recommendations of research connected to the innovation paradigm has been associated with values and norms that many find positive for example, “trust”, “cooperation”, and often soft issues, compared to the traditional focus on “hard technology” thus constituting a set of ideas appealing to the public. As has been pointed out by Mytelka and Keith Smith (2002), the recommendations of the paradigm are still not clear cut, and there are still “holes to be filled”. Whether or not this will turn into a continuous “policy and innovation learning process”, as these authors foresee, it seems to me, is still an open question. As has been shown, many of the organisational reforms and choices of instruments have perhaps been more influenced by ideas connected to “New Public Management”, for example stressing competition, evaluation, and bench marking (see also (Laestadius and Ylienenpää 2007).

How has the “*political game*”, shaped by the interests, ideologies and strategies of different actors, been played in this process and how important has it been? Has the governing party played an important role, for example? In my view, this factor has been somewhat underestimated in previous studies. It is quite clear that the new innovation paradigm fitted quite well with certain ideas of the governing party the Social Democrats and, as has been shown earlier, also those of the left-green governing “coalition” that de facto ruled Sweden at the beginning of the 2000s. The ideas were relatively easy to relate to a left wing business oriented policy, emphasizing the importance of investments in infrastructure, collaborative research programs, supporting SMEs etc., as an alternative to more right-wing proposals of deregulation and cutting taxes on SMEs. Another factor that seems to have been important is the key role played by Tomas Östros. Acting first as a Minister of Education and Research, and later as a Minister of Industry, he had a “boundary” role in the initiatives to develop a more coherent innovation policy.

To a very considerable extent, the innovation policy strategy was not a passive adoption on the part of the government. Rather it was part of a strategy to find a way to communicate with the industry, at sector or branch level, as an alternative to the failure of the Social Democratic government to negotiate with the industry on a national level (i.e. with the National Association of Swedish Business), and also its failure to formulate a growth policy for SMEs. As has been shown, the ideas and reform proposals found strong support within a coalition of sector specific industries and unions. These actors emphasised, for example, the role of good conditions for R&D to keep Swedish companies from moving production abroad. It can also be noted that this was a coalition of actors formed around VINNOVA and the idea of a system perspective on innovation and economic growth; apart from VINNOVA, associations and unions representing specific industries were important stake-holders in this coalition. As I have argued elsewhere, this coalition was similar to what has been called an “issue network”, and thus did not have the stability of a “policy community, due to e.g., the lack of strong resource dependencies, but was still able to build on strong arguments.

It is also here important to point out the close interplay between ideas and interests that seems to have been at work in this case. The discourse and practical ideas associated with the innovation paradigm, offered a suitable way to package a new and broader technology policy strategy. It was also suitable for Social Democratic ideology; it offered an alternative to market solutions and a more passive industry policy, forming a “new” corporatist structure, although on a sectoral, rather than national, level.

*Institutional* factors of importance in this case were mainly related to the importance of bureaucracy. In the development of a new innovation policy around the turn of the century, NUTEK played an important role in arguing for such a policy, and VINNOVA has, since it was established been an “entrepreneur-” or “avant-garde” agency initiating new policy programs, but also actively formulating ideas for influencing more overall policy goals, (through for example publications, research funding supporting innovation researchers etc.), and collaborating with other agencies. Trying to evaluate the relative power of different actors it seems like this is a case of relatively “bureaucracy driven” development, although within certain institutional limits and constrains. Naturally other experts of different kinds (researchers etc.) have played important roles, but the bureaucracy has played a crucial role structuring information, and interpreting new ideas.

The establishment and mission-oriented character of VINNOVA relates closely to the importance of persuasiveness as a policy instrument and the discussion about “ideological agencies” that has been raised by the Swedish political scientists Johannes Lindvall and Bo Rothstein. Lindvall & Rothstein (2006) have argued that the role of the Swedish public agencies in implementing public policies has changed dramatically. New public agencies are not established to implement laws decided on by the parliament, but to act more like “central nodes in networks” for example, by disseminating information, running contact networks, and evaluating public policies. Many agencies can even, according to Lindvall and Rothstein, be described as “ideological bureaucracies”; they are primarily set up to engage in formulating ideological positions in different policy areas. Lindvall & Rothstein argue that the development of these agencies has several consequences: firstly, it points to a less coherent state, where the “administrative state is turning into a new ideological battlefield”; secondly, it has implications for the democratic system: the state bureaucracies become formulators of ideas that are translated into proposals for policy change, while the role of the political parties becomes less important (Lindvall and Rothstein 2006).

A related institutional aspect, often brought up as an important aspect in the development of Swedish policy, is the dualistic character of the central bureaucracy. On the one hand it is divided into relatively small ministries, primarily functioning as administrative staffs for the cabinet ministers; and, on the other hand, it is organised into a large number of governmental agencies, under the auspices of, but organizationally autonomous from, the ministries. Some of these agencies are rather large, and VINNOVA is one example of a fairly large agency, although not by far the largest. One important aspect of this system concerns the rule of law: the agencies should make decisions based on law, not on the political will of the day. Obviously, the government (with the help of the ministries) have different resources to steer the agencies (for example the budget), and the relationship between the cabinet ministries and the agencies has a ‘negotiated’ character. I would argue that this relationship probably becomes more “asymmetric” in an area such as technology policy, since it is to a large extent based on knowledge a resource where a large agency generally has the upper hand against small and overloaded ministries. In his analysis of Swedish growth policy, Jon Pierre noticed that the coordination between governmental agencies was stronger than between the ministries in the Government, and maybe even stronger than between units within them (Pierre 2004). From a coordination perspective this might be

necessary, but from an “information” perspective it points to a problem. From what source does the Government get alternative information?

In institutional analysis it is often claimed that certain formative moments or sequences sometimes have long standing effects on policy development, in that certain choices are institutionalized, making them hard to change later on. One important “legacy” is related to the bureaucratic structure. Ever since the 1940s, there has existed an “intermediary” governmental agency (in between the political sphere and the research and industrial communities), that has played a central role over several decades in implementing but also formulating policy, and channelling ideas from experts, both from the academic sphere and from the OECD. The agency has also had a capacity to experiment with new ideas, translate them into concrete programs, and implement policy. Even though there have been number of examples of organizational reform, this bureaucracy represents a strong element of institutional stability. As shown, this “technology policy agency”, regardless of the name, has, successfully adapted to a changing environment. The primary mechanism of adaptation has been, to use Thelen’s concept, new layers that is new elements that have been brought in to adapt to new conditions, not least to demands for better scientific quality control and rationalisation of funding management. The agency has also been successful in learning and finding new solutions, often by “imitating” programmes and procedures from innovation policies in other countries. Overall, the agency has played a major role in both formulating and implementing policy in its area.

As shown in this study, the beginning of the 1990s was also a formative period, in that important organizational reforms were established (for example, research and Technology Bridge foundations), and also in that established agencies, partly to survive in a harsh budget climate, were experimenting with new solutions (such as Materials Consortia and Competence Centres in NUTEK, and the co-funding policy at the Swedish Council for Building Research). These new solutions led, for example, to a decentralization of research funding to “academic managers”. This was the key governance principle of the Materials Consortia program in the late 1980s, of the Competence Centres in the 1990s, and finally of the Centres of Excellence in the 2000s, but it has also influenced other programs at, for example, SSF and The Swedish Research Council. A second trend that has developed since the beginning of the 1990s has been the strong focus on *collaboration* and *co-funding*. This patters can be observed in the programs of NUTEK, and later VINNOVA, where co-funding has become a “rule”, but also within a specific context, in the

Swedish Council for Building Research at the beginning of the 1990s. In both contexts, the concept was not only a way to involve industry, but also a strategy for organizational survival (see for example Persson 2001). The development of new instruments in the 2000s was to a large extent based on solutions launched in the early 1990s, which first witnessed the introduction of programmes characterised by collaboration, co-funding, and a generally strong emphasis on decentralization coupled with accountability.

The last mentioned point is important, since it points towards the importance of NPM-oriented ideas in the development of technology and innovation policies. It also shows how the objectives of institutional arrangements can change over time. In the early 1990s, co-funding arrangements were introduced primarily as a way to handle a lower budget by sharing the burden with industry, but later on, in the context of the new innovation policy, these arrangements were legitimized by the needs of collaboration within an effective innovation system, or the importance of Triple Helix relations.

I would also suggest that the rather unfocused and disruptive character – especially from a political steering perspective – of policy development over time in this area has had something to do with the types and nature of issues that are dealt with, and the policy legacy of the field. Firstly, the degree of uncertainty in the area seems to be relatively high, compared to many of other policy areas; there is a lot of disagreement about whether or not instruments are effective, partly because the effects are very difficult to measure. The consequences are most often not visible in any concrete behaviour in any specific target group, unlike policy measures in, for example, social or environmental policy, where the effects of policies on individuals and organisations' behaviour are, at least to a larger degree, and more often, possible to measure. Secondly, the policy area is relatively “technocratic” and primarily the business of experts, bureaucrats and politicians and is seldom an issue important in the political communication with the electorate. When this does occur, as shown in this paper, the focus is seldom on specific policy instruments, since the public is not directly affected by them, but on showing that the government is capable of governing.

Thirdly, industrial policy, to which technology and innovation policy is closely related to, largely concerns reactive rather than active policy. The willingness of government to steer in this area is often limited, although expectations that they should do so often seem to be very high (Hall and Löfgren 2006). This is not a new finding, since earlier studies have also shown that

industrial policy tends to be more reactive than active, despite ambitions to the contrary (Jacobsson 1989; Pierre 2004). But some policies are also produced to handle earlier policies. This reactive character is partly visible in the government's handling of the R&D programs for the vehicle industry, its re-organisation of the industrial research institutes, its restructuring of the Technology Bridges Foundations, and even the establishment of VINNOVA. In these cases the government had to react to handle acute crises, consequences of earlier initiatives, or organisational problems. Fourthly, technology policy has since the late 1970s also been strongly influenced by efforts to formulate a more coherent research policy. Research policy has primarily been focused on basic research and has often been an arena for critique of sectorial, or more application oriented research. Further, its organisational solution for supporting research has mainly been the research council, controlled by the scientific community. This approach eventually "spilled over" into technology policy, generating new issues that had to be resolved. The tension between innovation policy as a sub policy of industrial policy and as a sub policy of general research policy has thus created a certain dynamic that has influenced the development of technology and innovation policy over time.

## References

### *Interviews*

- Marklund, Göran, Director of the Strategy Development Division at VINNOVA. Stockholm the 20<sup>th</sup> of August, 2007.
- Sandberg, Olof, Stockholm the 24<sup>th</sup> of January, 2007.
- Östros, Thomas, Member of the Swedish Parliament and former Minister of Education (1998-2004) and Minister Industry (2004-2006). Stockholm, the 24<sup>th</sup> of January, 2007.

### *Government bills*

- Prop. 1998/99: 94 *Vissa forskningsfrågor*.
- Prop. 1999/2000: 71 *Vissa organisationsfrågor inom näringspolitiken*.
- Prop. 1999/2000: 81 *Forskning för framtiden – en ny organisation för forskningsfinansiering*.
- Prop. 2000/01: 3 *Forskning och förnyelse*.
- Prop. 2001/02: 2 *FoU och samverkan i innovationssystemet*.
- Prop. 2004/05:80 *Forskning för ett bättre liv*.

### *Governmental reports*

- Ds 1999:68 *Att finansiera forskning och utveckling: rapport från Arbetsgruppen för fortsatt beredning av myndighetsstruktur för forskningsfinansiering*
- Ds 2004:63 *Innovativa Sverige – en strategi för tillväxt genom förnyelse*
- Flodström, A. (1999) *Utredning om vissa myndigheter*. Ministry of Industry.
- de Neergaard, C. (2004) *Bättre finansiering för kommersialisering av innovationer*. Ministry of Industry.
- SOU 1997:88 *Upphandling för utveckling*
- SOU 1998:128 *Forskningspolitik*

### *Literature and other sources*

- Arrow, K. (1962). Economic Welfare and the Allocation of Resources for Invention. In R. Nelson (Ed.) *The Rate and Direction of Inventive Activity*. New Jersey: Princeton University Press
- Benner, M. (1997). *The Politics of Growth. Economic Regulation in Sweden 1930-1994*. Lund: Arkiv förlag.
- (2001). *Kontrovers och konsensus. Vetenskap och politik i svenskt 1990-tal*. Stockholm/Nora: SISTER/Nya Doxa.

- Bergström, H. (2006). *Vem leder Sverige mot framtiden? Om förutsättningar för strategiskt politiskt beslutsfattande*. Stockholm: SNS förlag.
- Biegelbauer, P. S., & Borrás, S. (2003). Introduction. In P. S. Biegelbauer & S. Borrás (Eds.), *Innovation Policies in Europe and the US*. Aldershot: Ashgate Publishing Company.
- Borrás, S., & Lundvall, B.-Å. (1997). The Globalising Learning Economy: Implications for Innovation Policy. Report based on contributions from seven projects under the TSER programme, DG XII, Commission of the European Union.
- Bressers, H. T. A., & O'Toole, L. J., Jr. (1998). The Selection of Policy Instruments: a Network-based Perspective. *Journal of Public Policy*, 18, 213-239.
- Bromander, T., & Loxbo, K. (2004). Näringspolitik. In T. Bryder, D. Silander & C. Wallin (Eds.), *Svensk politik och den Europeiska unionen*. Malmö: Liber.
- Campbell, J. L. (1998). Institutional analysis and the role of ideas in political economy. *Theory and Society*, 27, 377-409.
- Chaminade, C., & Edquist, C. (2005) From theory to practice: the use of systems of innovation approach in innovation policy. CIRCLE Electronic Working Paper Series 2005:2.
- Edquist, C. (1997). *Systems of Innovation: Technologies, Institutions, and Organizations*. London: Pinter.
- Eklund, M. (2007). *Adoption of the Innovation System Concept in Sweden*. Uppsala: Uppsala University, Department of Economic History.
- Fagerberg, J., Mowery, D. C., & Nelson, R. R. (2005). *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.
- Fichtelius, E. (2007). *Aldrig ensam, alltid ensam: samtalen med Göran Persson 1996-2006*. Stockholm: Norstedt.
- Georghiou, L. (1998). Issues in the Evaluation of Innovation and Technology Policy. *Evaluation*, 4, 37-51.
- Gergils, H. (2006). *Dynamiska innovationssystem i Norden*. Stockholm: SNS förlag.
- Glimell, H. (1986). Hur kan teknisk forskning påverkas av statlig forskningspolitik? *Daedalus. Sveriges tekniska museums årsbok 1986*.
- Granat Thorslund, J., Elg, L., & Sandgren, P. (2005). En lärande innovationspolitik - samordning och samverkan? Stockholm: Vinnova (Vinnova analys 2005:07).
- Hall, P., & Löfgren, K. (2006). *Politisk styrning i praktiken*. Malmö: Liber.
- Hall, P., & Taylor, R. (1996). Political science and the three new institutionalisms. *Political Studies*, 31, 1-23.
- Hall, P. A. (1989). Conclusions: The Politics of Keynesian Ideas. In P. Hall (Ed.), *The Political Power of Economic Ideas*. Princeton: Princeton university press.
- (1993). Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain. *Comparative Politics*, 25, 275-296.
- Hecló, H. (1974). *Modern Social Politics in Britain and Sweden. From Relief to Income Maintenance*. New Haven: Yale University Press.
- Heidenhemier, A., Hecló, H., & Adams, C. T. (1990). *Comparative public policy: the politics of social choice*. New York: Macmillan.
- Hill, M. (2005). *The Public Policy Process*. London: Pearson Education.
- Hood, C. C. (1995). Contemporary public Management: A new global paradigm? *Public Policy and Administration*, 10, 104-117.
- Howlett, M., & Ramesh, M. (2003). *Studying Public Policy: Policy Cycles and Policy Subsystems*. Toronto: Oxford University Press.



- Jacobsson, B. (1989). *Konsten att reagera: intressen, institutioner och näringspolitik*. Stockholm: Carlssons.
- Kuhlmann, S. (1998). Moderation of Policy-Making Science and Technology Policy Evaluation Beyond Impact Measurement -The Case of Germany. *Evaluation*, 4, 130-148.
- Laestadius, S., & Ylienenpää, H. (2007). Att utveckla Vinnväxtprogrammet - erfarenheter och policyimplikationer. In S. Laestadius, C. Nuur & H. Ylienenpää (Eds.), *Regional växtkraft i en global ekonomi*. Stockholm: Santérus förlag.
- Lewin, L. (1967). *Planhushållningsdebatten*. Stockholm: Almqvist & Wiksell.
- Lindvall, J., & Rothstein, B. (2006). Sweden: The Fall of the Strong State. *Scandinavian Political Studies*, 29, 47-63.
- Lundvall, B.-Å., & Borrás, S. (2005). Science, Technology, and Innovation Policy. In J. Fagerberg, D. C. Movey & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation*. New York: Oxford University Press.
- Majone, G. (1989). *Evidence, argument and persuasion in the policy process*. New Haven: New Haven Yale U. P.
- Marklund, G. (1994). *Institutions and Appropriation in Swedish Technology Policy*. Uppsala: Uppsala University, Department of Economic History.
- Mytelka, L. K., & Smith, K. (2002). Policy learning and innovation theory: an interactive and co-evolving process. *Research Policy*, 31, 1467-1479.
- NUTEK (1993). *Svenskt näringsliv och näringspolitik 1992/93*. Stockholm: NUTEK.
- Nyblom, T. (1997). *Kunskap-politik-samhälle: Essäer om kunskapssyn, universitet och forskningspolitik*. Hargshamn: Hjalmar & Jörgen bokförlag.
- Painter, M., & Pierre, J. (2005). *Challenges to state policy capacity: global trends and comparative perspectives*. New York: Palgrave Macmillan.
- Persson, B. (2001). *Motsträviga myndigheter. Sektorsforskning och politisk styrning under 1980-talet*. Linköping/Stockholm: Tema Teknik och social förändring/SISTER.
- (2008). *Styrning, idéer och identitetsskapande: En studie om VINNOVA (kommande)*.
- Persson, T. (2003). *Normer eller nytta? om de politiska drivkrafterna bakom regeringskansliets departementsindelning*. Uppsala: Acta Universitatis Upsaliensis (Skrifter utgivna av Statsvetenskapliga föreningen i Uppsala, 154).
- Pierre, J. (2004). *En samlad tillväxtpolitik?* Östersund: Institutet för tillväxtpolitiska studier (ITPS).
- Pierson, P. (2004). *Politics in Time: History, Institutions, and Social Analysis*. Princeton, N.J.: Princeton University Press.
- Premfors, R. (1986). *Svensk forskningspolitik*. Lund: Studentlitteratur.
- Rhodes, R. A. W. (1997). *Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability*. Buckingham: Open University Press.
- Rothstein, B. (1992). *Den korporativa staten*. Stockholm: Norstedts.
- Sandgren, P. (2004). Skattestimulans eller skattesubvention? Till frågan om den svenska förordningen om särskilt forskningsavdrag vid taxering till statlig inkomstskatt (SFS 1973:421) under perioden 1973-1984: VINNOVA (Opublicerad rapport).
- Sandström, U. (2000). Framåtskridandets nyckel. Om framväxten av efterkrigstidens svenska teknik- och näringspolitik., *Electronic papers from the research landscape project (SISTER)*. Stockholm.

- Skocpol, T. (1985). Bringing the State Back In: Strategies of Analysis in Current Research. In P. Evans, D. Rueschemeyer & T. Skocpol (Eds.), *Bringing the State Back In*. Cambridge, Mass.: Cambridge University Press.
- Steinmo, S. (1993). *Taxation and democracy: Swedish, British and American approaches to financing the modern state*. New Haven: Yale University Press.
- Stevrin, P. (1978). *Den samhällsstyrda forskningen: en samhällsorganisatorisk studie av den sektoriella forskningspolitikens framväxt och tillämpning i Sverige*. Stockholm: Liber förlag.
- Thelen, K. (1999). Historical Institutionalism in Comparative Politics. *Annual Review of Political Science*, 2, 369-404.
- (2003). How institutions evolve. Insights from Comparative Historical Analysis. In J. Mahoney & D. Rueschemeyer (Eds.), *Comparative Historical Analysis in the Social Science*. Cambridge: Cambridge University Press.
- Thelen, K., & Steinmo, S. (1992). Historical institutionalism in comparative politics. In S. Steinmo, K. Thelen & F. Longstreth (Eds.), *Structuring Politics: Historical institutionalism in Comparative Analysis*. New York: Cambridge University Press.
- Weinberger, H. (1997). *Nätverksentreprenören: En historia om teknisk forskning från den Malmska utredningen till Styrelsen för teknisk utveckling*. Stockholm: Avdelningen för teknik- och vetenskapshistoria.
- Weir, M. (1992). Ideas and the politics of bounded innovation. In S. Steinmo, K. Thelen & F. Longstreth (Eds.), *Structuring Politics: Historical Institutionalism in Comparative Analysis*. Cambridge: Cambridge University Press.
- VINNOVA (2003). VINNOVA:s forskningsstrategi. Strategi för hållbar tillväxt. Stockholm: VINNOVA.
- Wittrock, B., & Lindström, S. (1984). *De stora programmens tid. Forskning och energi i svensk politik*. Stockholm: Akademilitteratur.

## **CIRCLE ELECTRONIC WORKING PAPERS SERIES (EWP)**

CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy) is a multidisciplinary research centre set off by several faculties at Lund University and Blekinge Institute of Technology. CIRCLE has a mandate to conduct multidisciplinary research and education on the following issues: Long-term perspectives on innovation, structural change and economic growth, Entrepreneurship and venture capital formation with a special focus on new ventures, The dynamics of R&D systems and technological systems, including their impact on entrepreneurship and growth, Regional innovation systems in different national and international contexts, International comparative analyses of national innovation systems and Policy design based on policy learning,

The CIRCLE Electronic Working Paper Series are intended to be an instrument for early dissemination of the research undertaken by CIRCLE researchers, associates and visiting scholars and stimulate discussion and critical comment.

The working papers present research results that in whole or in part are suitable for submission to a refereed journal or to the editor of a book or have already been submitted and/or accepted for publication.

CIRCLE EWPs are available on-line at: <http://www.circle.lu.se/publications>

### **Available papers:**

#### **2008**

##### **WP 2008/01**

**R&D and financial systems: the determinants of R&D expenditures in the Swedish pharmaceutical industry**

Malmberg, Claes

#### **2007**

##### **WP 2007/01**

**Path-following or Leapfrogging in Catching-up: the Case of Chinese Telecommunication Equipment Industry**

Liu, Xielin

##### **WP 2007/02**

**The effects of institutional change on innovation and productivity growth in the Swedish pharmaceutical industry**

Malmberg, Claes

##### **WP 2007/03**

**Global-local linkages, Spillovers and Cultural Clusters: Theoretical and Empirical insights from an exploratory study of Toronto's Film Cluster**

Vang, Jan; Chaminade, Cristina

##### **WP 2007/04**

**Learning from the Bangalore Experience: The Role of Universities in an Emerging Regional Innovation System**

Vang, Jan; Chaminade, Cristina.; Coenen, Lars.

##### **WP 2007/05**

**Industrial dynamics and innovative pressure on energy  
-Sweden with European and Global outlooks**

Schön, Lennart; Kander, Astrid.

**WP 2007/06**

**In defence of electricity as a general purpose technology**

Kander, Astrid; Enflo, Kerstin; Schön, Lennart

**WP 2007/07**

**Swedish business research productivity – improvements against international trends**

Ejeremo, Olof; Kander, Astrid

**WP 2007/08**

**Regional innovation measured by patent data – does quality matter?**

Ejeremo, Olof

**WP 2007/09**

**Innovation System Policies in Less Successful Developing countries: The case of Thailand**

Intarakumnerd, Patarapong; Chaminade, Cristina

**2006**

**WP 2006/01**

**The Swedish Paradox**

Ejeremo, Olof; Kander, Astrid

**WP 2006/02**

**Building RIS in Developing Countries: Policy Lessons from Bangalore, India**

Vang, Jan; Chaminade, Cristina

**WP 2006/03**

**Innovation Policy for Asian SMEs: Exploring cluster differences**

Chaminade, Cristina; Vang, Jan.

**WP 2006/04**

**Rationales for public intervention from a system of innovation approach: the case of VINNOVA.**

Chaminade, Cristina; Edquist, Charles

**WP 2006/05**

**Technology and Trade: an analysis of technology specialization and export flows**

Andersson, Martin; Ejeremo, Olof

**WP 2006/06**

**A Knowledge-based Categorization of Research-based Spin-off Creation**

Gabrielsson, Jonas; Landström, Hans; Brunsnes, E. Thomas

**WP2006/07**

**Board control and corporate innovation: an empirical study of small technology-based firms**

Gabrielsson, Jonas; Politis, Diamanto

**WP2006/08**

**On and Off the Beaten Path:  
Transferring Knowledge through Formal and Informal Networks**  
Rick Aalbers; Otto Koppius; Wilfred Dolfsma

**WP2006/09**

**Trends in R&D, innovation and productivity in Sweden 1985-2002**  
Ejeramo, Olof; Kander, Astrid

**WP2006/10**

**Development Blocks and the Second Industrial Revolution, Sweden 1900-1974**  
Enflo, Kerstin; Kander, Astrid; Schön, Lennart

**WP 2006/11**

**The uneven and selective nature of cluster knowledge networks: evidence from the wine industry**  
Giuliani, Elisa

**WP 2006/12**

**Informal investors and value added: The contribution of investors' experientially acquired resources in the entrepreneurial process**  
Politis, Diamanto; Gabrielsson, Jonas

**WP 2006/13**

**Informal investors and value added: What do we know and where do we go?**  
Politis, Diamanto; Gabrielsson, Jonas

**WP 2006/14**

**Inventive and innovative activity over time and geographical space: the case of Sweden**  
Ejeramo, Olof

**2005**

**WP 2005/1**

**Constructing Regional Advantage at the Northern Edge**  
Coenen, Lars; Asheim, Bjørn

**WP 2005/02**

**From Theory to Practice: The Use of the Systems of Innovation Approach for Innovation Policy**  
Chaminade, Cristina; Edquist, Charles

**WP 2005/03**

**The Role of Regional Innovation Systems in a Globalising Economy: Comparing Knowledge Bases and Institutional Frameworks in Nordic Clusters**  
Asheim, Bjørn; Coenen, Lars

**WP 2005/04**

**How does Accessibility to Knowledge Sources Affect the Innovativeness of Corporations? Evidence from Sweden**  
Andersson, Martin; Ejeramo, Olof

**WP 2005/05**

**Contextualizing Regional Innovation Systems in a Globalizing Learning Economy: On Knowledge Bases and Institutional Frameworks**

Asheim, Bjørn; Coenen, Lars

**WP 2005/06**

**Innovation Policies for Asian SMEs: An Innovation Systems Perspective**

Chaminade, Cristina; Vang, Jan

**WP 2005/07**

**Re-norming the Science-Society Relation**

Jacob, Merle

**WP 2005/08**

**Corporate innovation and competitive environment**

Huse, Morten; Neubaum, Donald O.; Gabrielsson, Jonas

**WP 2005/09**

**Knowledge and accountability: Outside directors' contribution in the corporate value chain**

Huse, Morten, Gabrielsson, Jonas; Minichilli, Alessandro

**WP 2005/10**

**Rethinking the Spatial Organization of Creative Industries**

Vang, Jan

**WP 2005/11**

**Interregional Inventor Networks as Studied by Patent Co-inventorships**

Ejeremo, Olof; Karlsson, Charlie

**WP 2005/12**

**Knowledge Bases and Spatial Patterns of Collaboration: Comparing the Pharma and Agro-Food Bioregions Scania and Saskatoon**

Coenen, Lars; Moodysson, Jerker; Ryan, Camille; Asheim, Bjørn; Phillips, Peter

**WP 2005/13**

**Regional Innovation System Policy: a Knowledge-based Approach**

Asheim, Bjørn; Coenen, Lars; Moodysson, Jerker; Vang, Jan

**WP 2005/14**

**Face-to-Face, Buzz and Knowledge Bases: Socio-spatial implications for learning and innovation policy**

Asheim, Bjørn; Coenen, Lars; Vang, Jan

**WP 2005/15**

**The Creative Class and Regional Growth: Towards a Knowledge Based Approach**

Kalsø Hansen, Høgne; Vang, Jan; Bjørn T. Asheim

**WP 2005/16**

**Emergence and Growth of Mjärdevi Science Park in Linköping, Sweden**

Hommen, Leif; Doloreux, David; Larsson, Emma

**WP 2005/17**

**Trademark Statistics as Innovation Indicators? – A Micro Study**

Malmberg, Claes