

# MONIT

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monitoring and implementing horizontal innovation policy

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## Governance of the Norwegian Innovation Policy System

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## WORKING PAPER

MONIT is a collaborative project in the context of OECD to  
explore national capabilities in innovation policy and  
governance in the innovation driven economy

For more information, see [www.step.no/monit/](http://www.step.no/monit/)

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## Foreword

The MONIT project was endorsed by the TIP working party in December 2002. Building on the results of the TIP NIS project, its main objective is to generate knowledge on how to improve innovation policy governance and create a more coherent and comprehensive innovation policy. The focus is on how to achieve a more horizontal innovation policy through co-ordination with non-core policy areas, vertical integration and coherence, and new forms of governance and policy making processes. More specifically it studies the foundations for innovation policy governance by highlighting issues such as political leadership, building effective co-ordination mechanisms, socio-political foundations for information exchange and policy learning, cultural factors in policy systems and related sources for coherent policy making.

The MONIT network consists of 13 countries, all devoted to generate knowledge to be shared by the others. The MONIT project is organized in 3 work packages (WP):

- WP1 consists of a broad analysis and assessment of the national policy profiles and challenges, as well as of key governance issues;
- WP2 includes policy case studies in the areas of information society, sustainable development and transport, and regional policy;
- WP3 will synthesize the results from WP1 and WP2 and draw the policy implications.

STEP is in MONIT studying the Norwegian innovation policy system through several inter-linked studies. A main focus is to better understand the underlying logic of the Norwegian system, its roots in terms of cultural traditions and the main priorities coming out of it. Both mapping studies and more detailed studies of parts of the innovation policy system are therefore covered in the project.

Norway is the lead country in this network, while Austria, Finland and Netherlands are co-leads. The Norwegian part of the project is commissioned by the Research Council of Norway (RCN), and funded by this council and the ministries of Science and Education, Trade and Industry and Regional Affairs. The project also consists of a learning arena organized by the users through which results and perspectives generated by MONIT is disseminated and discussed.

Svend Otto Remøe

Project responsible

## Executive summary

This report contains an analysis of the foundations for a horizontal, coherent innovation policy in Norway spanning the range of governmental boundaries. It is part of a wider OECD study to investigate lessons and models for the renewal of institutions and practices of policy making in OECD countries as the innovation driven economy makes a more effective policy co-ordination necessary.

The main results in this study of Norwegian governance are highlighted as following:

- a) The Norwegian governance system has in general changed since the years after the IIWW from a more interventionist and strategic role played by the government to a model based on New Public Management. This development has led to increasing state fragmentation and segmentation, less strategic policy making and more attention to a balanced but restricted use of state budget surpluses.
- b) Although innovation policy has been on the agenda for some time, it has still a weak position in the overall policy system. In particular, there is a weak link between economic policy and innovation policy, leading to a weak strategic framework for innovation policy. This is most evident in the current attempt by the government to launch a coherent innovation policy plan (HIP).
- c) The Norwegian governance structure is ill fitted for the challenges posed by the need to generate more coherence. The ministries are by tradition strongly autonomous, and the co-ordination mechanisms in place, like RFU, GFU and more recently RUI, are typically static, focussing on short term co-ordination and steering needs. Long term mechanisms have weak foundations in the Norwegian system.
- d) This is evident in the state budgetary system, where short-termism prevails, and where even the half-yearly state budget revision gains a policy making role on its own.
- e) The long term needs of the Norwegian economy has recently been well addressed, pointing to future value creation needs exceeding what the current economic structure is likely to achieve. However, related to c), the governance system has so far been less able to create a momentum and implementation strategies for the changes in priorities that need to take place. An exception is the increasing budgetary allocations for R&D, albeit through new institutional mechanisms outside the state budget.
- f) The inherent principle of sector responsibility in the Norwegian system has many advantages, one of which is an obligation for each ministry to develop R&D strategies for their own sectors of responsibility. However, this system needs to be amended to be better able to take up more strategic policy making on the one hand, and give more leeway to RCN on the other hand.
- g) Among the proposals presented, two are highlighted: First, a better integration between policy areas through goal alignment and monitoring of implementation is warranted. Second, a strengthening of the prime minister's office (PMO) is suggested to generate more horizontal, strategic policy making on areas that require full governmental attention, like innovation policy.

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# 1. Introduction

## 1.1. Background: The MONIT project

OECD's project on National Innovation Systems (NIS) started originally in 1995. Being managed by the working party of Technology and Innovation Policy (TIP) it set out to explore the requirements for redirecting innovation policy in OECD countries, taking into account the new insights in the innovation process that came out of the innovation research at that time. While many accepted that the linear model of innovation did not capture the realities of the innovation process, it was acknowledged that public policy was still founded upon the linear model and its implications for policy. Hence, the OECD NIS project became an important collaborative mechanism for generating new data based on the interactive model of innovation and for developing a set of recommendations for public policy.

Formally, the OECD NIS project was concluded in 2001, and had over the years produced many outputs that were fed into other OECD work and generated by itself several publications on industrial clusters, networks, human mobility as well as synthesis reports for renewals of innovation policy. However, in the concluding work (OECD 2002), a critical question was raised that became the starting point for the current MONIT project: If the developed economies are changing into a more innovation oriented and dynamic mode, is it feasible that national governments and their policy making modes can remain largely the same? More precisely, given the needed changes in the policy content, how could or should governments change their structures and processes to better accommodate the dynamism in their environments?

To explore these issues, OECD and its working party for Technology and Innovation Policy (TIP) endorsed in 2002 a new collaborative study called MONIT (Monitoring and assessing national innovation policies). It was to be carried out as the activities of the preceding NIS project with voluntary research activities conducted by the countries willing to participate in a *modus operandi* referred to as focus groups. In all 13 countries decided to participate (see annex 1). The Nordic countries had been driving forces behind the MONIT project, and Norway volunteered to take the role as the lead country with the overall responsibility to coordinate and steer the progress and direction of the project. It was also decided to broaden the lead role to ensure a collaborative management of the project, and Finland, Austria and Netherlands became co-leading countries.

Innovation policy is not a new area, but the focus on the capabilities of the policy systems delivering innovation policy implies a shift in focus. If coherent, comprehensive innovation policy is needed, it needs to span horizontal boundaries of government to ensure that all policy areas that have consequences on a firm's or industry's innovative performance are coordinated and integrated. To achieve a best possible empirical basis for drawing conclusions and implications for innovation policy, it was decided to include studies of policy areas that had similar characteristics as innovation policy in being broad, crossing sectors and in need to exploiting co-ordination mechanisms. Hence, in addition to the study of core innovation policy, a set of non-innovation policy areas was selected: Regional policy, environmental policy (or policy for sustainable development), policy for the information society (in many countries as national actions plans), and transport policy. While information society became mandatory for all participating countries, the others were voluntary. Norway conducted the

first three (all published by STEP, the contracted research institute, as independent publications).

To ensure a best possible outcome, STEP engaged in collaboration with Programme for Sustainable Development (Prosus) at the University of Oslo. Prosus did most of the study on sustainable development, and given their well-founded knowledge of this area, were able to provide broad and thorough perspective on the interface between policies for sustainable development and innovation policy.

This report is a national overview of the set of determinants and consequences of the Norwegian innovation governance system. It has been produced within a joint format of the participating MONIT countries to allow some level of comparison. However, the main purpose of it is to reveal the strengths and weaknesses of the system to help induce changes and adaptations that may lead to better policy.

## **1.2. Interactions in policy systems**

A critical point of departure is that seen from the vantage point of view from a firm, policies and their incentives, disincentives and regulatory effects interact to create a policy environment for that firm. This includes both core science, technology and innovation policy areas like R&D, as well as other, often more peripheral policy areas that have innovation consequences for firms. Governments typically know too little about these interactions and, needless to say, how to correct or accommodate policies to produce a coherent whole, if possible.

Seen from this perspective, it becomes a concern for governments to engage in processes that produce such outcomes. But governments may not be able to do so, or do it late and with little effectiveness. With the typical trait of governments, sector based division of labor between ministries, they will vary in terms of how and to which extent they are able to overcome these divisions and create what the MONIT project has termed horizontalization.

Horizontal interactions are combined with vertical ones: Vertical interactions depict relationships between different layers of government bodies, like between ministries and agencies, and between ministries and the regional level. Typically, this is most important concerning implementation of policies, but lead in total to very different governance structures across countries. Recent developments in governance underline this: New Public Management (NPM) has been to various degrees adopted across the industrialized world, leading to more decentralization. Still, horizontal innovation policies is a key concept as it frames the focus on the need to co-ordinate and govern many policy domains to achieve better innovation policy.

## **1.3. Coherence: A key feature of horizontal innovation policy**

Horizontalization is not a goal in itself, but rather a characteristic of a policy system. It could be defined as the degree to which (in this case) innovation policy is guided by a comprehensive national strategy in which contributions from the various sectors are linked to achieve policy coherence. The link between horizontalization and the arrangements for co-ordination and governance is a crucial one.

Hence, it is the national capabilities of national policy systems to generate coherent innovation policy that are at stake. Coherence is important for many reasons:<sup>1</sup>

- Coherent policies are more likely to be effective and more readily applied in a consistent and equitable way;
- Governments are increasingly faced with complex and difficult issues, which may impact differently on different areas of society;
- They frequently have a range of objectives which cannot easily be reconciled and may be in conflict;
- Faced with greater accountability and challenge, through parliaments, civil society and the media, lack of coherence becomes readily apparent and results in uncertainty loss of confidence.

The concept has basically three dimensions:

- Horizontal coherence ensuring that individual, or sectoral, policies, build on each other and minimises inconsistencies in the case of (seemingly) conflicting goals;
- Vertical coherence ensuring that public outputs are consistent with the original intentions of policy makers;
- Temporal coherence ensuring that today's policies continue to be effective in the future by limiting potential incoherence and providing guidance for change.

The MONIT study aims at generating lessons for national governments on how to achieve coherence in innovation policy by highlighting issues like political leadership, building effective co-ordination mechanisms, socio-political foundations for information exchange and policy learning, cultural factors in policy systems and related sources for coherent policy making.<sup>2</sup>

#### **1.4. An institutional approach**

The MONIT project builds on an important assumption: The national and global economies are changing to become more dynamic, innovation and knowledge driven, and complex. A next proposition is that governments need to respond, but need to do so in manners different from before. There is a widespread, but differentiated, need to assume the same characteristics as their environments. Governments need to be able to develop new capabilities if they shall be able to deliver coherent policies for this changing world. Which are they? What are their determinants? And which are the inertia and counterforces that will undermine a socio-institutional change?

The institutional approach taken here is that “social choices are shaped, mediated and channelled by institutional arrangements” (Powell and DiMaggio 1991:2). Behaviours and structures change slowly because they are institutionalized. People in different institutions have different preferences, and individual choice can therefore not be understood without reference to the cultural and historical framework in which they are embedded (March and

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<sup>1</sup> From a discussion paper for the Centre of Government Network: Government Coherence: The Role of the Centre, OECD, PUMA.

<sup>2</sup> See appendix for a list of tools that may enhance policy coherence. This list, derived from the above OECD paper, serves only as a point of departure. It is the aim of MONIT to expand and develop this into instructive lessons for member countries.

Olsen 1995). Institutionalization is understood as “phenomenological process by which certain social relationships and actions come to be taken for granted” and a state of affairs in which shared cognitions define “what has meaning and what actions are possible” (Zucker 1983:2; 1987). Cognitive and cultural explanations are needed to gain a full understanding of institutions and how they behave. Institutions are products of interpretations of their environments, and even assume traits and characteristics that are blended in by these interpretations (Meyer and Rowan 1977).<sup>3</sup>

Hence, the research reported here focuses deliberately on the dynamics and inertia of formal and informal institutions, and on social and cultural processes that make up the creation and reinterpretation of these institutions.

For analytical purposes, the study of these phenomena reflects the key stages of a policy cycle, as depicted below:

- a) Agenda setting
- b) Prioritization
- c) Policy implementation
- d) Learning and evaluation

This is certainly a formalistic version, and may invite a similar understanding of the policy making process as in the case of the linear model of innovation. However, this not the case, as these processes are interlinked and should be understood as elements of an interactive model of policy making. The processes of co-ordination, integration and communication in policy systems cut across these stages or elements. In the present study, the stages above illustrate four key capabilities in governance of innovation policy (or any other policy area), and the aim of MONIT as of this report is to identify the systems strengths and failures influencing the policy making systems to provide effective governance.

## **1.5. The focus of the report**

The focus of the MONIT project is to thus to identify and help develop national capabilities of appropriate innovation governance. Each country has its own history or trajectory which implies that strict comparisons or benchmarking across countries is not seen as useful. This report will focus on the capabilities of the Norwegian system to govern, adapt and co-ordinate policies for innovation.

It addresses the following issues.

- How is the trajectory or history of the innovation policy area and what has been the outcome in terms of particular biases or priorities?
- How does the current innovation system look like and who are the key actors?
- What are the challenges facing Norway and what is the likely position of STI policies vis a vis these challenges?
- How processes like agenda setting, prioritisation and stakeholder involvement conducted?

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<sup>3</sup> See also Rannveig Røste: Studies of innovation in the public sector: a literature review. STEP – Center for Innovation Research. Oslo, 2004.



- How are policies co-ordinated?
- To which extent are there in place mechanisms for policy learning and capabilities for strategic shifts in policy and innovation system trajectories?

Hence, we will aim at understanding how the system came into being, its key determinants, how it works and to what extent it constitute the capabilities needed to respond to the challenges it meets. We end with an assessment of strengths and weaknesses that seem to emerge from the analysis, and highlight both some particular recommendations for policy in the Norwegian context as well as some lessons to be learned for other countries.

## 1.5. Methodological considerations

This work is part of a wider international collaboration, and a general methodological framework has been developed with this in mind. The approach was endorsed by the TIP group in December 2003, but has been amended since. This report represents the work accomplished on the work package 1 in the MONIT terminology, focussing on the core STI policy making system.<sup>4</sup>

In short, the methodological approach taken derives from the focus on processes and dynamics of policy making and the idea to identify crucial national capabilities for developing governance practices, policy coherence and horizontal policy. As the national practices are indeed national, the task at hand is to identify them as inherent components of national traditions, structures and cultures. Hence benchmarking is not the issue, rather, learning across countries on governance practices.

There one common quantitative activity in the project, the comparative illustration of performance on science, technology and innovation indicators as presented in chapter 2. This was achieved by the Dutch team in MONIT, using the data from a recent EU study<sup>5</sup>. Countries outside the EU were then asked to supply their corresponding data to generate a complete set of all countries (please see chapter 2 for further information).

In addition, we launched a small survey among policy makers and people being placed such that they would have opinions on the challenges ahead for Norway in this context and what blank spots there may be in the policies addressing these challenges. Results from this survey are included in chapter 4.

Most of the work has been done through using available documents, studies and public information like state budget data. In addition, and due to the processual focus in this study several interviews have been conducted with key players in the policy system. Further, three mini case studies have been conducted to generate more substantial insight into the processes concerning selected, but highly important policy developments: The development of the new government plan for a coherent innovation policy (the so called HIP), the processes related to the recent implementation of a tax refund scheme (skatteFUNN), and the reforms of the Norwegian Research Council).

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<sup>4</sup> The work package 2 consists of various policy studies of more peripheral but highly relevant areas like the information society, environmental policy, regional policy, and transport policy. The approach taken in these studies are basically similar to the one taken in work package 1, and key findings are integrated in this report.

<sup>5</sup> “Benchmarking national research policies: The impact of RTD on competitiveness and employment (IRCE)”, EU Commission 2002.

## 2. Historical development of the science and innovation system and governance structure<sup>6</sup>

### 2.1. Introduction

In October 2003, the Norwegian government presented a plan for the introduction of a “holistic” innovation policy, entitled *From Idea to Value*.<sup>7</sup> At the heart of this plan is the idea that innovation policy should be embedded in a range of policy fields, and not only in the traditional fields of industrial and research policy. In this respect, the new policy is in accordance with what the European Commission has termed a “third generation” innovation policy. This third generation policy differs from the first and second generations - building on a linear and a systemic understanding of innovation respectively - in that it emphasizes the importance of integrating and coordinating innovation policies across several policy areas.<sup>8</sup>

This paper surveys the historical developments in Norwegian innovation policies leading up to today’s plan for a “third generation” policy. Whereas the term innovation policy was introduced in Norway as late as in the early 1980s, innovation policy as a functional policy concern is far from new. It has been an integral part of wider industrial policies, covering areas such as research policy, educational policy, regional policy, etc.

For pragmatic purposes, the scope of the paper is limited to the postwar period. The paper is organized as a chronological overview of central policy developments. Based on what have been the overriding trends, the period in question is divided into four phases: *1946 to the late 1970s*; *the 1980s*; *the 1990s*; and *recent developments*.<sup>9</sup> In conclusion, the historical developments in Norwegian innovation policies over the past fifty years will be viewed in light of the idea of different generations of innovation policy.

### 2.2. 1946 to the late 1970s: State supported development of large-scale industry

In the decades following the Second World War and up to the late 1970s, Norwegian industrial policies were strongly influenced by the idea that there existed a “productivity gap” or “technology gap” between the USA and Europe. Subsequently, “America” stood out as a model for industrial development, and the dominant strategy was to promote the construction of big industry: Large organizational units directed towards large scale production.

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<sup>6</sup> This chapter is based on Hauknes, J. and Wicken, O., *Innovation policy in the post-war period*, STEP Report 01-2003. Hauknes and Wicken's report has however been reworked, edited, and expanded with substantial new contributions.

<sup>7</sup> *From Idea to Value - the Government's Plan for a Comprehensive Innovation Policy (Fra idé til verdi- Regjeringens plan for en helhetlig innovasjonspolitik)*, Ministry of Industry and Trade, 2003. See analysis in chapter 5.

<sup>8</sup> Lengrand, Louis et al, *Innovation Tomorrow, Innovation Policy and the Regulatory Framework: Making Innovation an Integral Part of the Broader Structural Agenda*, DG Enterprise, October 2002

<sup>9</sup> Needless to say, this periodization must not be interpreted too rigidly.

The State played a central role in this strategy. In general, the first postwar decades were characterized by a strong belief in the need for direct state intervention to promote industry. This is clearly evident in the strong role the Labour governments in the 1950s and 1960s had in industrial development, also with a substantial and actively used public ownership.

The Second World War was followed by great optimism regarding the roles of science and technology as driving forces in economic development and growth. Immediately after the war, a commission was established to assess the organization of Norwegian technological research. In its report (published in 1946), this so-called Vogt Commission stressed that future industrial development rested upon two forms of research activity: First and foremost, basic scientific research; and secondly, technological research which could develop new forms of technology based on the results of the former.

Since there were few Norwegian companies that were large and financially strong enough to engage in technological research on a large scale, the State took upon itself to establish a public technological research institute sector. The immediate postwar years saw the rise of the Norwegian Defence Research Establishment (FFI, *Forsvarets Forskningsinstitutt*), the Institute for Nuclear Energy (IFA, *Institutt for Atomenergi*) and the Central Institute for Industrial Research (SI, *Sentralinstituttet for industriell forskning*). The public institute sector was closely linked to the research council for technological and scientific research, NTNF (*Norges Teknisk Naturvitenskapelige Forskningsråd*) which had been established in 1946.<sup>10</sup>

Whereas the Vogt Commission upheld scientific research as the main vehicle in industrial development, a report published by NTNF in 1964 emphasized the crucial role of applied technological research. Also, the report seemed to express a somewhat broader understanding of the role of research in processes of economic development and growth, in that it stated that research could only be a driving force in industrial development through interaction with other growth factors.<sup>11</sup> Nevertheless, the belief in science as the prime mover in economic development remained strong well into the 1970s.

As to regional policy in the first decades following the Second World War, the main focus was upon facilitating regional distribution and preventing de-population of rural areas. Policy efforts were directed towards the redistribution of capital and employment opportunities from central areas experiencing growth to regions that were characterized by dwindling primary industries.<sup>12</sup>

A perspective that should not be forgotten during these post-war decades, is linked to the relationships between partners in the labour market and the state. The political project in these years were first and foremost the development of the welfare state. This demanded a financial base, i.e. a greater GDP. The Labour Party provided a legitimating context for labour and capital to enter into what has been termed the “class compromise” in which workers agreed to high rates of technology deployment, rationalization and productivity for the state to be able to finance the welfare state. Key mechanisms were agreements on the firm level, and the

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<sup>10</sup> Wicken, Olav, ”Forskning og industriutvikling”, in Sejersted, Francis (red.), *Synspunkter på norsk forskningspolitikk – tre innlegg i debatten, TMV Skriftserie* No 16, 1996, pp. 54-56; Skoie, Hans, *Instituttsektoren – viktig sektor med problemer, NIFU skriftserie* nr. 15/2003, pp. 44-45

<sup>11</sup> Wicken, Olav, ”Forskning og industriutvikling”, in Sejersted, Francis (red.), *Synspunkter på norsk forskningspolitikk – tre innlegg i debatten, TMV Skriftserie* No 16, 1996, p. 58

<sup>12</sup> Isaksen, Arne, “Mot en regional innovasjonspolitik”, in Isaksen, Arne (ed.), *Innovasjoner, næringsutvikling og regionalpolitikk*, Kristiansand: Høyskoleforlaget, 1997, p. 211

Norwegian industry had hence a relatively progressive and technology-friendly labour during these years.

### **2.3. The 1980s: Growth through new technology and market mechanisms**

The industrial policies of the immediate postwar period were gradually dismantled in the second half of the 1970s, and the 1980s saw several new policy developments. Central trends in this decade were the introduction of the so-called strategic technology areas (*hovedinnsatsområdene*); reduced state intervention; a technology-push orientation; a new focus on small and medium sized enterprises (SMEs), and a shift in regional policies from the previous orientation towards regional redistribution to an innovation policy focus upon the determinants and drivers for regional and local economic development.

Also, as has been mentioned earlier, it was in this decade “innovation policy” appeared as a term for policy concern in Norway. It was first used in the report of the Thulin Commission which was published in 1981.<sup>13</sup> The terms of reference this commission had been given was to consider the volume, organization and efficiency of public support to industrial R&D in Norway. In its report, the Thulin Commission emphasized and reinforced the view expressed in the 1964 NTNF report, that research could only contribute to industrial development through interaction with other factors. Underlying this view, was the conviction that it was *innovation* - and not science in itself - that was the central driving force in processes of economic development and growth.<sup>14</sup>

Industrial policies in the 1980s were, as they had been in the previous decades, characterised by attempts to reconstruct industrial structures. However, while the emphasis until the late 1970s had been on establishing a corporate structure based on large and financially strong companies, the 1980s saw a shift towards attempts to develop new industrial sectors based on new, generic and enabling technologies. The development of this specific structure was regarded as necessary to achieve long term economic growth and to be able to compete in an international market. Technology policy priorities as these were widely shared among industrialised countries and were generally focussed on ICTs, material technology and biotechnology.

The new strategy of the 1980s was based on the idea that future industrial expansion was dependent on success within a few core high-tech technologies.<sup>15</sup> Growth could not be achieved by improving old products and industries, but only by developing new products or completely new industries, i.e. by an industry wide process of structural replacement of old industries with new ones.

In Norway, the main instrument to develop new, viable high-tech industries was the policy of strategic technology areas. There was broad national consensus behind the idea to increase funding for a few selected technologies - IT, oil and gas, new materials, biotechnology, and

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<sup>13</sup> NOU 1981:30A *Research, technological development and industrial innovation (Forskning, teknisk utvikling og industriell innovasjon)*

<sup>14</sup> Wicken, Olav, “Forskning og industriutvikling”, in Sejersted, Francis (red.), *Synspunkter på norsk forskningspolitikk – tre innlegg i debatten, TMV Skriftserie* No 16, 1996, p. 62

<sup>15</sup> In Norway, this policy was developed over the period 1982-85 and was introduced fully in 1986 in the State Budget for the financial year 1987.

fish farming - and to improve the co-ordination between public and private actors - such as companies, universities, R&D institutes, public agencies, etc.- within each technology area.

It was generally accepted that the development of new industries was the outcome of scientific and technological processes. The new industries were defined as “science based industries”, and R&D became the core element in this industrial strategy. It became a central policy concern to expand the R&D sector (public and private), and to improve the industry-research relationship so that more science-based industries could be established.

One policy measure that strongly contributed to increasing the size of the Norwegian research sector, especially the institute sector, was the so-called “Goodwill agreements”. They were among a series of measures introduced in 1978 that were to ensure long term supply of inputs to oil and gas exploration and exploitation. Through the “Goodwill agreements”, international oil companies improved their position in the competition for getting concessions to explore and produce oil and gas from petroleum fields in the North Sea by procuring R&D and technological services from Norwegian suppliers.<sup>16</sup>

The strategic technology areas policy was successful in the sense that public funding for the selected areas increased, but there is less evidence that the system succeeded in improving co-ordination. Each technology area had different histories and institutional settings, and there were different policy measures used for each area.

In spite of a rapid increase in R&D activities in the course of the 1980s - partly as a consequence of the introduction of the targeted technology areas, partly as a reflection of the rapid increase up to 1986-87 of research activities related to the expansion of offshore petroleum exploitation - the general policy apprehension at the end of the decade was that there was a serious underinvestment in Norwegian R&D. Several policy priorities were introduced to counter the perceived gap in R&D performance and bring Norwegian R&D performance up to OECD levels in terms of the GERD/GDP-indicator.<sup>17</sup> In a research policy White paper published in 1989, the second Brundtland government (in government during 1986-1989) set the goal of increasing public funding of R&D activities by 5 per cent per year in real terms.<sup>18</sup>

Another trend in the 1980s, discernable already in the late 1970s, was the ideological shift away from using direct state intervention to promote industry towards using market mechanisms. The generally strong belief of the 1950s and 60s in active state involvement in industrial development, broke down along with the breakdown of the counter-cyclical policies of 1976-78. The Lied Commission of 1979 was a signal of the need for a new market oriented approach,<sup>19</sup> a transition that was brought to fruition with the second Brundtland Government.

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<sup>16</sup> For an elaboration on the “Goodwill agreements” see e.g. Nås, S.O. and Wiig, H., *Goodwill – good business? Analyse av goodwillavtalenes betydning for næringslivets FoU, STEP Report 02-1993*; and Wiig, H. and Nås, S.O., *Teknologiavtalene som insentiv i norsk forskningspolitikk*, Notat 14/92, *the Future-Oriented Technology Policy programme*, the Royal Norwegian Council for Scientific and Industrial Research, 1992

<sup>17</sup> No one at the time seemed to notice that in terms of the alternative intensity indicator - GERD/capita or GERD/employment - Norwegian R&D performance was at least comparable with the level of all major trade partners.

<sup>18</sup> White Paper No 28 (1988-1989) *On research (Om forskning)*

<sup>19</sup> NOU 1979:35, *Structural problems and possibilities for growth in Norwegian industry (Strukturproblemer og vekstmuligheter i norsk industri)*

In line with this development, the 1980s saw the emergence of the policy stance of “pushing the institute sector towards the market” - to increase its receptivity to the needs and expectations of the industrial sectors. The background was the increasing criticism directed towards the research institutes, which were accused of neglecting their industrial role. Up to the early 1980s the R&D organisations in the national institute sector - whether they were formally autonomous or public organisations - had generally been seen in functional terms as performing a public task: Producing and supplying the public good of technological knowledge. In 1982 a “deregulative” priority was set for the institute sector, and the formerly public institutes were devolved from the public sector. The relation to NTNF and other R&D funding agencies were implicitly seen in terms of these agencies buying a service - the performance of specific research activities - on behalf of society, while the commercial viability and competitiveness of the institutes were their own responsibility.

A striking aspect of the innovation policies of the 1980s is that the former focus on the science base shifted to a view of the criticality of the technology base. We have seen that applied technological research was given a more independent position vis-à-vis basic research already in the NTNF report published in 1964. In the 1980s science and technology were conceptualized as essentially different phenomena (although there were still believed to be links between the two), something which implied an autonomous technology. This made the technology push characteristic of the policies quite dominant. The considerable focus of generic technologies did not necessarily imply a dominant technology push view, but in the specification of this focus that came with the strategic technology areas and the related plans, this became evident.

While the first postwar decades had seen a strong orientation towards large enterprises, in the late 1970s and the 1980s increased emphasis was put on SMEs. This shift is reflected in the SME White Paper which was published in 1978.<sup>20</sup> The emergence of the innovation policy concept in Norwegian politics at the beginning of the 1980s can be seen against this background. The concomitance of the SME White Paper and the Thulin Commission is probably not coincidental - innovation policy emerged as a policy concern in this period as a consequence of the increased SME focus.

The 1980s also saw a new orientation in regional policies. From the middle of the decade, there was an increased focus upon *local innovation and value creation* as the central means for obtaining settlement and growth in the regions. Thus, the traditional regional distribution policy gave way for a regional innovation policy. This shift is evident in the White Paper on regional policies published in 1989.<sup>21</sup>

## 2.4. The 1990s: Searching for a new model

Towards the end of the 1980s, an increasing dissatisfaction with the outcomes of both the strategic technology area strategy and the technology push orientation became evident, and the policies of that decade were consequently reassessed. Although not representing a radical break with previous policies, the White Paper on industrial policy published in 1989 was felt to signal a new approach.<sup>22</sup> However, the 1990s saw no coherent new strategy for industrial

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<sup>20</sup> White Paper No 7 (1977-78), *Small and medium sized industrial firms (Små og mellomstore industribedrifter)*

<sup>21</sup> White Paper No 29 (1988-89), *Policies for regional development (Politikk for regional utvikling)*

<sup>22</sup> White Paper No 53 (1988-1989), *On industrial policy (Om næringspolitikk)*

policies, and the decade was in general characterized by a lack of an overriding vision in this policy area.

Central features of the policies of the 1990s were a departure from the “best industrial structure” strategy (at least in theory), and an orientation towards a broad innovation policy in which a “diffusion of technology” strategy played a central role. The technology push orientation of the previous decade gave way for arguments stressing the importance of client capabilities and network interactions. The decade was furthermore characterized by institutional restructuring; and a continuing emphasis on both SMEs and regional innovation policies.

The broader socio-economic background for a new industrial policy of the 1990s was a series of problems occurring in the period 1986 to 1993 which by politicians was perceived to constitute a “crisis”. This led to a departure from the “best industrial structure” strategies of the previous decades - that is, the attempts to construct specific industrial structures that were seen as prerequisites for industrial growth and competitiveness. The emphasis on a “best industrial structure” lost ground to new arguments in favour of broad innovation activities in various parts of the economy. These arguments were based on the view that policies should not be directed towards specific (and radical) structural changes, but to promoting improved productivity and diffusion of new technologies throughout all parts of the economy. Norwegian industrial policy studies submitted by the Aakvaag, Henriksen and (the first) Hervik Commissions - all in the latter half of the 1990s - attached importance to maintaining a broad perspective on innovation.<sup>23</sup>

Several policy instruments were established to pursue the “diffusion of technology” strategy. The old state owned diffusion institution, the State Institute of Technology (STI, *Statens teknologiske institutt*, in existence since 1916) was transformed into a private foundation. Under the name of the National Institute of Technology (TI, *Teknologisk institutt*), it was to promote knowledge on technology and management for SMEs. A new Service Office for Industry for Northern Norway (VINN, *Veiledningstjenesten for Nord-Norge*) had parallel functions to TI but only focused on the special needs of the northern parts of the country. Similar services were offered by the Company Advisory Service (BRT, *Bedriftenes Rådgivningstjeneste*) consisting of eighteen advisory companies offering consultancy services to SMEs. Information on new technologies were also provided by the Norwegian Industrial Attachés (*Norges Industriattacher*) which were part of the TI system, and the Norwegian Design Council (*Norsk Designråd*) offered information in the area of design.

In spite of the new broad “industry neutral” orientation, the initiatives taken by the governments and Parliament (Stortinget) during the 1990s show that IT *de facto* remained a core technology of industrial policies. There are strong indications that many politicians - and other groups and individuals - still followed the “new industries” strategy from the 1980s and argued that future welfare was dependent on the development of a strong IT sector in the economy.

Another feature of the 1990s, is that the technology push approach of the previous decade was countered by arguments of the criticality of client capabilities. These arguments did not,

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<sup>23</sup> Aakvaag Commission, *The Challenge – Research and innovation for new growth (Utfordringen – Forskning og innovasjon for ny vekst)*, Report prepared by a commission appointed by the Ministry of Industry and Energy, 1996; NOU 1996:23 *Competition, competence and environment (Konkurranse, kompetanse og miljø)*; NOU 1997:27 *Cost-benefit-analyses (Nytte-kostnadsanalyser)*

however, generate a “market pull” alternative strategy. Rather the subsequent development quickly proceeded to approaches where network interactions were argued to be important. A White Paper on research policy in 1993 introduced innovation and systems theory to a larger audience and stressed the need for larger R&D investments.<sup>24</sup> However, it did not give birth to a larger debate. Neither did it lead to any substantial increase in national investments in R&D.

Also, central institutions in the R&D system came under scrutiny. In 1990, the Grøholt Commission was established to assess the organization of Norwegian research. The commission’s conclusions led to the disbanding of the former five research councils and the establishment of an intended single body research council, The Research Council of Norway (NFR, *Norges forskningsråd*), in 1993.<sup>25</sup> Besides being a research council in the established sense, the new body was given the explicit task of being a central policy formulating and advising body for national R&D and innovation policies.

The 1990s also saw the establishment of the Norwegian Industrial and Regional Development Fund (SND, *Statens Nærings- og Distriktsutviklingsfond*). Like the Research Council of Norway, SND was established as a re-organisation and re-orientation of several pre-existing institutions, including the Regional Development Fund (*Distriktenes Utbyggingsfond*), The SME Fund (*Småbedriftsfondet*) and the Industrial Fund (*Industrifondet*). The initiative came from several commissions involved in evaluating the Norwegian credit market policies and groupings advocating a reorganization and simplification of the instrument portfolio.<sup>26</sup> SND’s main task was to stimulate industrial development, by contributing to the development, modernization and readjustment of Norwegian industry in general, and by promoting initiatives which would secure lasting and profitable regional employment.

The new emphasis on regional innovation policy - rather than the traditional regional distribution policy - from the mid 1980s, was upheld in the 1990s. This is evident i.a. from the explicit consideration of “regional policies for metropolitan areas”, with a White Paper launched in 1991.<sup>27</sup> With 1993 and 1997 White Papers on regional policy these aspects were integrated into a perspective that highlighted the policy need of considering the “broad” and the “narrow” regional policy. By “broad” policy was meant all policies that indirectly affect development in the regions, whereas “narrow” policy referred to policies targeted specifically towards this goal.<sup>28</sup> The distinction was used to argue that to make regional policy in the narrow sense efficient, an explicit assessment and regulation of the broad regional policy was necessary. This led to reorganisations within the relevant ministry, with the responsibility for the assessment of broad regional policies being institutionalised within the ministry. The point to note here is that this involved a supervisory role from the perspective of regional innovation policies towards the regional implications of innovation policies as formulated in other ministries.

In the latter half of the 1990s the importance of financial strength of large companies once more became a political matter. Globalisation - and in particular the increased importance of

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<sup>24</sup> White Paper No 36 (1992-93) *Research for the community (Forskning for fellesskapet)*

<sup>25</sup> NOU 1991:24 *Organization for totality and diversity in Norwegian research (Organisering for helhet og mangfold i norsk forskning)*

<sup>26</sup> e.g. the Steigum Commission and the Kleppe Commission

<sup>27</sup> White Paper No 17 (1991-92), *Norway needs its big cities (Norge trenger storbyene)*

<sup>28</sup> White Paper No 33 (1992-1993), *City and countryside side by side. On regional development (By og land hand i hand. Om regional utvikling)*; White Paper No 31 (1996-97), *On district and regional policies (Om distrikts- og regionalpolitikken)*



multinational corporations (MNCs) in the global economy - raised the question of how Norwegian companies could compete with large global multinationals in increasingly more open international capital and goods markets. The sale of the most successful Norwegian company of the early 1990s, Nycomed, and the national symbol company Freia (chocolates) to foreign competitors, as well as Kværner's decision to move its headquarter to London, triggered a discussion on how to keep national control of the more important companies as well as being an attractive economy for MNCs. The argument for national control was the need for keeping knowledge production and R&D in the country.

One of the political problems on the agenda in the middle of the 1990s was therefore to develop financially strong national companies and ownership. The State had become a major owner in Norwegian industry, controlling both big manufacturing industry, the bank sector and high tech institutions. State ownership could be used to make sure that important industrial companies remained Norwegian. In addition the government returned to the old policy of selecting some "national champions" which could be a collaborator in developing strong national ownership.

The 1990s was the decade during which globalisation became more intensified as a context for innovation policy. At the same time Norway had to resolve her problematic relationship to the European Union as it is now called. After Norway voted negatively on the membership question in 1994, an European Economic Area Agreement was put in place, consisting of Norway and the remaining EFTA countries except Switzerland, and EU. A major component in this collaborative agreement was membership in the European R&D policy, or the Framework Programme. The participation in this European system of knowledge creation and diffusion has since been well received and accepted as an integrated part of Norway's innovation or R&D policy.

## **2.5. Recent developments: Break through for a broad innovation policy?**

Towards the end of the 1990s, the political interest in innovation and R&D policies increased. While innovation and systems theory had been highlighted in the aforementioned 1993 White Paper, there had been no immediate breakthrough for this line of thinking, nor a substantial increase in national R&D funding. From the late 90s however, Norwegian policy makers have increasingly directed their attention towards matters such as increasing national investments in R&D; increasing commercialization of research results; improving the quality of research and higher education; and stimulating network interactions. The recent years have also seen a strong emphasis upon regional innovation policies, and substantial changes in both the organization and contents of innovation policies in general.

A White Paper on research policy published in 1999 was completely structured around innovation theory.<sup>29</sup> The Research Council became the institutional stronghold for the theory and was supported by the Research Department at the Ministry of Science and Education and partly by the Research Department of the Ministry of Industry and Trade. In addition there were individuals in ministries and in other agencies working on industrial policy for developing a new strategy based on innovation theory. In 1999 the Research Council succeeded in creating an alliance with the Norwegian Industrial and Regional Development

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<sup>29</sup> White Paper No 39 (1998-1999), *Research at the beginning of a new era (Forskning ved et tidsskille)*

Fund (SND) and the Norwegian Export Council (Eksportrådet) to promote the idea that Norway needed a new industrial strategy and that this strategy should be based on innovation theory.<sup>30</sup>

Increasing national investments in R&D was a central theme in the 1999 White Paper on research policy. It was recommended that R&D funding should reach the OECD average, measured as a proportion of GDP (GERD), by 2005. This has become a standing political goal. One of the measures that have been introduced to obtain this goal is the Fund for Research and Innovation which was established in 1999. Another central measure is the FUNN tax break scheme which was introduced in 2001 on the basis of the report of the Hervik Commission. The Commission was appointed in 2000 to consider policy measures that could stimulate an increase in private investments in R&D. The Commission recommended that companies investing in certain types of R&D projects should receive financial compensation from the State, but was split in the question of whether the compensation should be given as a tax credit or as direct financial support. The latter alternative won out in the FUNN scheme, which gave public financial support to companies buying research and development from universities, colleges and research institutes. In 2002, however, FUNN was replaced by SkatteFUNN, which gives companies tax deductions for investments in R&D projects.<sup>31</sup>

The past few years have also seen increased focus on commercialization of university and college research. The report of the Bernt Commission which was appointed in 2000 to evaluate measures for increasing activities in this field, stressed that universities and colleges should consider commercialization as part of their activities.<sup>32</sup> The argument of the Commission was followed up with an amendment to the Act on Universities and Colleges, giving Norwegian universities and colleges an explicit responsibility for facilitating the exploitation of research results to the common good.<sup>33</sup> In the wake of this amendment, several universities have established their own technology transfer offices, one example being Birkeland Innovasjon at the University of Oslo. The goal of increasing commercialization of university and college research has furthermore led to an amendment to the Act on rights to inventions made by employees. The amendment, which was passed in 2002, gave the research institutions the rights to exploit inventions made by their teachers and researcher. This right had formerly belonged to the individual employee.<sup>34</sup>

Another central policy concern has been to improve the quality of Norwegian research and higher education. In 2001, the Centres of Excellence scheme was introduced for the establishment of temporary research centres characterized by concentrated, focused and long term research efforts on a high international level. Based on recommendations in the 2000 report of the Mjøs Commission on Higher Education, the Minister of Education and Research carried out a “quality reform” at Norwegian universities and colleges in 2003. The reform introduced a new grade system and degree structure, and made the studies shorter than what they had formerly been. In connection with the quality reform, the Ministry of Education and

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<sup>30</sup> Koch, P., *Country Report Norway: October 2002-September 2003, the European Trend Chart on Innovation*, 2003

<sup>31</sup> Koch, P., *Country Report Norway: October 2002-September 2003, the European Trend Chart on Innovation*, 2003

<sup>32</sup> NOU 2001:11 *From insight to industry (Fra innsikt til industri)*

<sup>33</sup> Ot.prp. nr. 40 (2001-1002) *Om lov om endringer i lov 12. mai 1995 nr. 22 om universiteter og høyskoler og lov 2. juli 1999 nr. 64 om helsepersonell*

<sup>34</sup> Ot.prp. nr. 67 (2001-2002) *Om lov om endringer i lov av 17. april 1970 nr. 21 om retten til oppfinnelser som er gjort av arbeidstakere*

Research established a new national organization for quality in education, called NOKUT. This organisation is now the main authority as regards the accreditation and approval of institutions and educations.<sup>35</sup>

Over the recent years, Norwegian policy documents have increasingly stressed the central role network interaction plays in innovation. A 2001 White Paper on the Norwegian Industrial and Regional Development Fund, SND, stated that one of the main tasks of this organization should be to stimulate innovation in industry through the development of networks between different actors.<sup>36</sup> Several policy measures have been introduced to encourage networking, e.g. MOBI which is to promote interaction between industry, research and education environments and innovation policy institutions, and Value Creation 2010 which network based innovation at the regional level.

The regional innovation policies that we have seen emerged in the late 1980s, have been carried on by recent governments. The Labour Government in office from 2000 to 2001 published a White Paper on regional affairs that stressed the need for innovative and competitive companies in the regions.<sup>37</sup> The Ministry of Local Government and Regional Development in the following Centre-Right government has been very much involved in the development of policy instruments targeting regional innovation. One new development under this Ministry has been a delegation of responsibilities from central authorities to the county administrators, who have been given more influence over the administration and allocation of innovation policy measures and funds.<sup>38</sup>

The last few years have furthermore seen substantial changes in both the organization and contents of Norwegian innovation policies. A reorganization of the Research Council of Norway was announced in 2002 and carried out in 2003. The reorganization implied that the former six divisions were replaced by three. The background was an evaluation of the Council that in part was very critical towards the activities of the institution, arguing that it had not been able to coordinate Norwegian research as originally planned in 1993, when the former research councils were united in this new institution.<sup>39</sup>

Based on an evaluation of the structure of business-oriented policy instruments and institutions, a new state owned company - Innovation Norway - was established on January 1<sup>st</sup> 2004. The new institution replaced the former Norwegian Government Consultative Office for Inventors (SVO), the Norwegian Trade Council, the Norwegian Industrial and Regional Development Fund (SND) and the Norwegian Tourist Board. One of the main arguments for this reorganization was that the business oriented policy instruments should be better coordinated and directed to one common goal: to contribute to increased innovation nationwide.<sup>40</sup>

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<sup>35</sup> Koch, P., *Country Report Norway: October 2002-September 2003, the European Trend Chart on Innovation*, 2003

<sup>36</sup> White Paper No 36 (2000-2001), *SND: New efforts, new growth, new industry (SND: Ny giv, ny vekst, nytt næringsliv)*

<sup>37</sup> White Paper No 34 (2000-2001), *On district and regional policies (Om distrikts- og regionalpolitikken)*

<sup>38</sup> Koch, P., *Country Report Norway: October 2002-September 2003, the European Trend Chart on Innovation*, 2003

<sup>39</sup> Koch, P., *Country Report Norway: October 2002-September 2003, the European Trend Chart on Innovation*, 2003

<sup>40</sup> St.prp. nr. 51 (2002-2003) *Virkemidler for et innovativt og nyskapende næringsliv*

The evaluation of the policy instrument system and the establishment of Innovation Norway are part of the ongoing process towards the introduction of a holistic innovation policy. This cross-ministerial process was initiated by the Minister of Education and Research, but has been placed under the leadership of the Ministry of Trade and Industry. The only political steering document for this process so far is the plan *From Idea to Value* which was mentioned in the introduction of this paper. According to this plan, the explicit responsibility for developing a holistic policy - and coordinating this policy across different policy areas and ministries - will be placed under a separate Government Committee.<sup>41</sup>

## 2.6. Towards a 3<sup>rd</sup> generation innovation policy?

It is evident from the overview presented here, that the contents and organization of Norwegian innovation policies have changed considerably over the past fifty years. Today's plan for a "holistic" innovation policy, with its emphasis upon network interaction and policy integration, differs radically from the innovation policies of the first post war decades where innovation and industrial development were seen as the direct results of scientific and technological research. While the latter can be termed "first generation" innovation policies based on their underlying linear understanding of innovation, the new "holistic" policy can - as has already been pointed out - be seen as an expression of "third generation" policies.

Our historical overview nevertheless shows that it is impossible to identify any clear cut transitions from a first via a second to a third generation innovation policies. Developments have taken place in a very gradual manner. Whereas policies in the period from 1946 to the late 1970s indeed were strongly colored by "the linear model", we have seen that a report published by NTNf as early as in 1964 expressed the view that innovation occurred on the basis of interaction between several growth factors, and not as a result of research alone.

Furthermore, while the view that innovation results from interaction between several factors was explicitly upheld by the Thulin Commission in the early 1980s, the linear model did in fact continue to influence actual policies. That decade's focus upon generic technologies as it was expressed in the "strategic technology areas" implied a dominant technology push approach to innovation and industrial development. We have also seen that it was not until the late 1990s that policies began to be structured around innovation and system theory to a substantial degree, and we thus can speak of a breakthrough for "second generation" innovation policies.

It is worth drawing attention to another feature that our historical overview makes apparent, namely that there is commonly a time lag from the point where a new orientation in innovation policy is expressed at the "idea level" - that is in policy documents such as white papers and government reports - until it is reflected in actual policies. Against this background, it should be pointed out that today's "holistic" - or "third generation" - innovation policies are still in the process of being formulated. When and to what extent such policies are actually implemented - and whether they will turn out to be successful - remains to be seen.

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<sup>41</sup> *From Idea to Value - the Government's Plan for a Comprehensive Innovation Policy (Fra idé til verdi- Regjeringens plan for en helhetlig innovasjonspolitik)*, Ministry of Industry and Trade, 2003. See also chapter 6.

## 3. An overview of the current innovation system and the key actors<sup>42</sup>

### 3.1. Mapping the actors

The institutional structure of the Norwegian innovation policy system anno 2002 is depicted in fig. 1. The main change since then has been a merger of three agencies related to industrial and innovation policy (see below). As such, this merger illustrates a main theme in this paper; a concentration on the agency level in the Norwegian system to accommodate and solve perceived co-ordination needs. Below follows a brief description of the actors in the system.

In Parliament (Stortinget) the committees dealing most directly with innovation policy issues, mainly through the yearly state budgets and white papers, are:

- The Standing Committee on Science and Education (Utdannings- og forskningskomiteen)
- The Standing Committee on Trade and Industry (Næringskomiteen)
- The Standing Committee on Energy and the Environment (Energi- og miljøkomiteen)

There is no single parliamentary forum with an innovation policy responsibility where these issues are focused upon and co-ordinated, although the Committee on Education, Research and Church Affairs handles broad R&D policy matters.

Accordingly, the responsibility for innovation as well as R&D matters is divided between several ministries. Most ministries allot funds to R&D (see horizontal indicators in Remøe et al 2003), the major players being:

- The Ministry of Education and Research
- The Ministry of Trade and Industry
- The Ministry of Health and Social Affairs
- The Ministry of the Environment
- The Ministry of Defence
- The Ministry of Fisheries
- The Ministry of Agriculture

The Ministry for Education and Research, The Ministry of Trade and Industry and the Ministry of Local Government and Regional Development have the main responsibility for the development of national innovation policies.

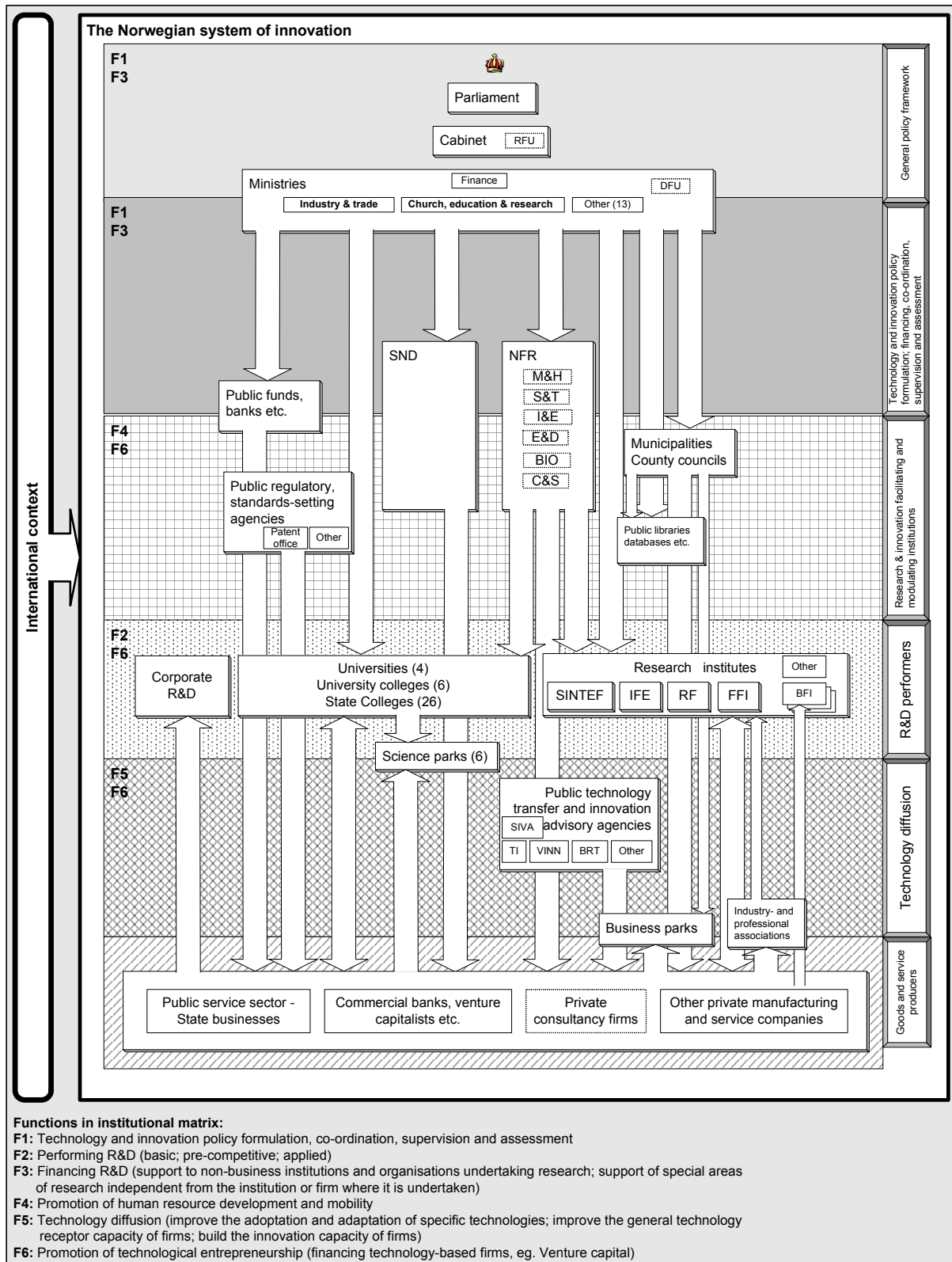
Norwegian R&D policy formulation is based on the so-called “sector principle”, meaning that each ministry is responsible for promoting and funding research activities within their own areas. The Ministry of Education and Research is responsible for the overall R&D policies, for funding large parts of basic science in the universities and colleges, and for co-ordinating sectoral R&D policies. At the governmental level there are two high level committees focusing on science and technology policy related issues: The inter-ministerial Research

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<sup>42</sup> The chapter is based on section 0.1 in Koch, P., *Country Report Norway, October 2002-September 2003, the European Trend Chart on Innovation*, 2003.

Forum for Government Officials (Departementenes forskningsutvalg – DFU) and the Government’s Research Board (Regjeringens forskningsutvalg – RFU). The Minister of Education and Research chairs RFU.

**Figure 1. Policy-centred organisational map of the Norwegian system of innovation**



**Source:** STEP

**Comment:** RCN and NFR = The Research Council of Norway

### **3.2. Three key agencies**

The Research Council of Norway (Norges forskningsråd) was established in 1993, as a merger of the former five research councils. The institution bears overall responsibility for national research strategy, and manages nearly one third of public sector research funding. One of the principal tasks of the Research Council is to promote co-operation and co-ordination among Norwegian research institutions. The Council identifies important fields of research, allocates funds and evaluates R&D. It is also called upon to offer strategic advice to the Government on science and technology issues (see also chapter 6).

SND, the Norwegian Industrial and Regional Development Fund (now Innovation Norway) was, like the Research Council, established in 1993 as a reorganisation and reorientation of several pre-existing institutions. It was until the beginning of the year the central institution for public funding of industrial and regional development in Norway. SND was then merged as mentioned above with other agencies: Firstly, SVO, the Norwegian Government Consultative Office for Inventors (Statens veiledningskontor for oppfinnere) was a public body that offers advice and scholarships to inventors. The office may support patent applications and the building of prototypes. Secondly, The Norwegian Trade Council (Norges Eksportråd) was a foundation aimed at strengthening Norwegian exports. The Council assists companies and public institutions in the field of international technology cooperation. The most important part of its activities takes place in its 39 foreign offices, situated in 32 countries. Thirdly, the Norwegian Tourist Board (Norges Turistråd) had the responsibility to further tourism through industrial development and international marketing. The idea behind the merger is to improve the co-ordination of international and regional perspectives, and to create a larger, highly integrated agency for innovation and industrial development, Innovation Norway.

SIVA, the Industrial Development Corporation of Norway (Selskapet for industrivekst) is a state owned enterprise with its head office in Trondheim, Norway. SIVA is a public enterprise, established to further the creation of business opportunities, and increased employment. Its goal is to develop strong local environments by providing investment capital, competence and networks for small and medium-sized companies. It owns and operates 40 industrial parks and is a co-owner in ten science and “knowledge” parks. SIVA is organised as a “network” organisation, and operates within three areas: real estate, development and investment/finance. These areas often overlap. The company is owned by the state, and controlled by the Minister of Local Government and Regional Development.

### **3.3. Support institutions**

TI, the National Institute of Technology (Teknologisk institutt) is a private foundation with approximately 270 employees. TI receives public support in order to be able to offer small and medium-sized enterprises relevant expertise to improve company know-how, productivity and profitability. TI offers consultancy and developmental services, training, expertise and technology transfer programmes and laboratory test and certification services. TI works in areas like manufacturing technology, environmental and safety technology, business development and internationalisation.

VINN, the Advisory Institute in Northern Norway (Veiledningsinstituttet i Nord-Norge) is a semi-private consulting and contract R&D institute, organised as a foundation, and receiving public support for parts of its activity. The foundation offers services within several technical and economical/administrative areas. The purpose is to improve the competitive strength of



companies through increased productivity, improved profitability, stronger market orientation and profitable environmental and quality management measures. The most important industries addressed by VINN are engineering and other industrial sectors, fishing and the building and construction industry. They serve as advisors and offer elementary and post educational training, laboratory and testing services. The regional focus of VINN reflects the structural weakness of this part of the country.

Argentum is a limited company owned by the state. It is to strengthen competent leadership in industry. Argentum invests in companies and tries to influence the venture capital sector, helping them to gain access to international capital. One aim is to help more ideas and concepts lead to commercially viable enterprises and to maximize the profit made from investments. Argentum will normally own between 33 and 50 percent of the companies involved.

GIEK is a state institution for guarantees insurance of export credits. The main objective is to promote export of Norwegian goods and services and Norwegian investments abroad.

The Norwegian Design Council (Norsk Designråd) was established in 1963 by the Norwegian Trade Council and The Confederation of Norwegian Business and Industry (NHO). It is now a foundation financed by the Ministry of Trade and Industry and by commissions made through counselling and various projects. The Council is to further the use of good design in market oriented product development and marketing.

Some public financial institutions remain outside the SND structure. The Norwegian local government-funding agency Kommunalbanken is a special purpose agency established for the Norwegian public sector to secure competitive financing to the Norwegian local governments. Loans are granted solely to local government or against a guarantee. Although Kommunalbanken may be seen as an element in the Norwegian system of innovation, the agency does not appear to pursue systematic innovation policies as such.

Another major investor in Norwegian industry is the Norwegian Public Security Fund (Folketrygdfondet). The fund is operating as a large and significant financial investor. The fund's industrial investment activities are based on using part of the future liabilities of the public security system for industrial investment with a strict financial objective.

There are other institutions that are not primarily taking initiatives to do R&D nor financing the activities, but which still facilitate or in other ways modulate or give direction to research efforts and innovation processes. Among these are public regulatory, standards setting or appropriability agencies, and municipalities and county councils.

As a part of the general framework within which firms and innovators operate there exists a system of supervisory public agencies taking care of public interest. Their main areas of work relate to problems of public health, working conditions, consumer issues, and the environment. They establish a system of minimum standards for products and processes and by doing so influence the use of technology in the business sector. Such agencies include the Norwegian Pollution Control Authority (Statens forurensingstilsyn); the National Office of Building Technology and Administration (Statens bygningstekniske etat); the Drug Administration (Statens legemiddelkontroll); and the Norwegian Metrology and Accreditation Service (Justervesenet)

Related to processes of deregulation of key infrastructure related sectors, such as telecom, energy production and utilities and rail transport, the need of establishing new systems of regulation to accommodate the effects of deregulation have been met by the establishment of new and reorganised regulating agencies. Standards are taken care of and co-ordinated by the Norwegian Standards Association (Norsk standardiseringsforbund), which also represents Norway in international standardisation work. It operates on the basis of advice from five independent technical standardisation organisations, for general standards, construction, electrotechnics, technology and post and telecommunications respectively.

The Norwegian Patent Office (Styret for det industrielle rettsvern/Patentstyret) offers protection for inventions, trademarks and designs and gives information, guidance and training in the area of intellectual and industrial property rights. Norway has so far not become a member of the European Patent Organisation (EPO).

Municipalities and county councils have traditionally played an important role in business development by way of infrastructure building and maintenance, and by providing public services in general. Over the last years, counties and some municipalities have taken up the challenge to stimulate business development and innovation within their geographical area. The counties will now be given a much larger role in the design and implementation of innovation policies.

Information is a crucial ingredient in innovation and R&D, and libraries play an important role in making information available. The National Office for Research Documentation, Academic and Special Libraries (Riksbibliotekstjensten), the National Library (Nasjonalbiblioteket) and the library services at the universities are independently founded.

Science parks also constitute an element in the Norwegian innovation system. The term “Science Park” is used to describe a property-based initiative

- which has operational links with universities, research centres and/or other institutions of higher education,
- which is designed to encourage the formation and growth of knowledge-based industries and other organisations, normally resident on site,
- which has a management team actively engaged in fostering the transfer of technology and business skills to tenant organisations.

Among the Norwegian Science Parks are:

- Tromsø Science Park Ltd., Tromsø
- Trondheim Innovation Centre Ltd., Trondheim
- Leiv Eriksson Innovation Ltd., Trondheim
- Nyfotek Ltd., Trondheim
- Bergen High-Technology Center Ltd., Bergen
- Rogaland Science Park Ltd., Stavanger
- Campus Kjeller Ltd., near Oslo
- Oslo Research Park Ltd., Oslo
- Ås Science Park Ltd, Ås

The traditional role of the science parks has been to be service organisations and real estate managers. Now, however, the role as incubators and assistants for innovation is becoming

increasingly important. Many parks have their own commercialisation units or companies, and they are often local representatives for the FORNY-programme (see Remøe et al 2004).

## 4. Perceived policy challenges and policy mix

In this section, we map the *central challenges* in Norwegian innovation policies as they are perceived by actors in the policy system, as well as the *current policy mix* – that is the set of established priority areas and actual policy efforts within the field of innovation policies. The mapping is done against the background of an actor oriented picture of the national innovation system (NIS), as shown in figure 2.

By comparing the information of central challenges and current policy mix, we assess the degree of correlation between perceived problems and actual efforts in today's Norwegian innovation policies. Although one may expect a considerable degree of overlap between the pictures, this is not necessarily the case. It is expected that factors such as lack of attention, lack of capabilities for experimentation, and inertia leading to politically untouchable areas are typically part of the policy system and should hence lead to significant gaps.

### 4.1. Performance of the STI system

We start, however, with an assessment of the existing priorities and biases in the Norwegian STI system. This assessment is based on joint MONIT work to assemble information on performance indicators that reveal in this case Norway's performance in contrast with other countries. This is not done as benchmarking individual indicators which is a common technique. Rather, we highlight how the bias for the given country is on the context of an average picture of other MONIT countries, with a view to inducing questions about how this bias can be justified and explained, and we aim at stimulating a critical focus on the prioritization capability of the system

A necessary set of information has been reliable, comparable information on how each country performs on a set of science, technology and innovation indicators. To avoid unacceptable workloads, a dataset was chosen that included most countries as well as the main indicators relevant for the study. Hence, a recent EU study was chosen, and expanded with data on non-EU countries that were willing to provide information on those same indicators<sup>43</sup>. The statistical work has been done by the Dutch team for all involved countries. To better present how each country scores relative to the others, without creating nation-specific patterns that were not comparable due to the scales, all data were normalised, and the performance for each country is illustrated on the backdrop of the "average others". Hence, the scales have no meaning in absolute terms.

The result for Norway is shown in figure 2 below. The (red) circle depicts the average of all countries involved, while the black, broken line illustrates how Norway scores relative to this average.

The picture reveals an interesting, albeit somewhat contradictory message. Norway score relative high on labour productivity, although this must be seen in relation to the large GDP, a fact that also leads to lower GERD (Gross expenditures on R&D) than what would have been the case without the oil rent. More illuminating is the combined effect of high scores on tertiary education (without which knowledge investments (D3) would have been lower) and number of Ph.D.s. It illustrates well that Norway is an education society, with a great number

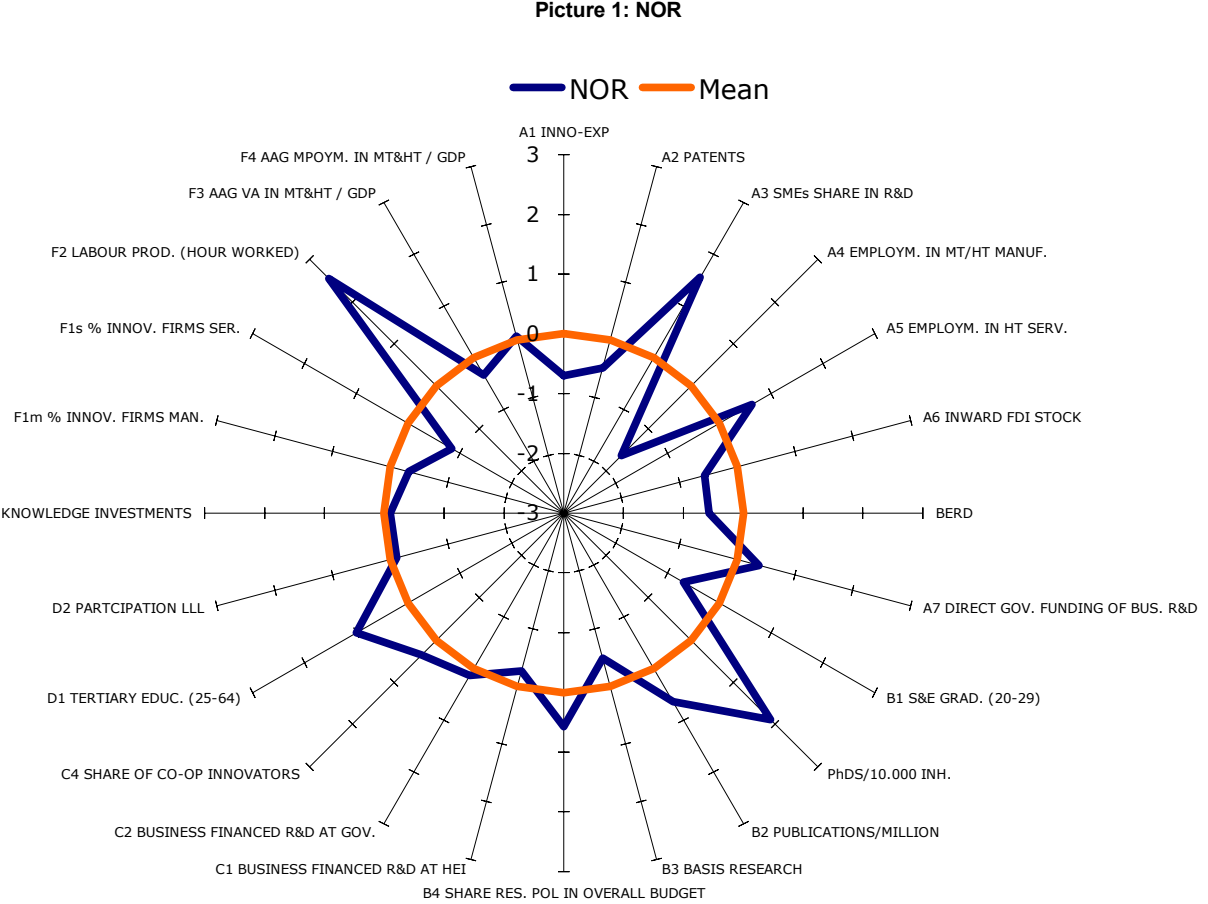
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<sup>43</sup> "Benchmarking national research policies: The impact of RTD on competitiveness and employment (IRCE)", EU Commission, STRATA-ETAN Expert Group, 2002.

of Ph.D.s in the overall economy. On the other hand, the production of graduates in science and engineering is very low, a recurrent theme in Norwegian debates. Taken together with the fact that BERD (Business expenditures on R&D) is low, it seems reasonable to argue that the significant knowledge investments in Norway create a well educated work force, but one which is not engaged significantly in business R&D.

Looking more closely at the innovation-related indicators (A1-7), patenting, employment in medium and high tech manufacturing, inward foreign direct investments and BERD are all low. On the other hand, the share of SMEs in R&D is high, as is employment in high tech services as well as direct government funding of business R&D. This would tell us that employment in high tech services are well developed, and telecom probably influences this. The other side of this coin is the relatively low share of innovative firms in services in general (F1s). The combination of low, innovation expenditures, low patenting, low FDI and low BERD is particularly worrisome, as it conveys a message about a low overall innovation activity and vitality in the Norwegian economy.

**Fig 2: STI performance for Norway**



The combination of relatively acceptable scores on C2 and C3 should be seen together with

A7 to confirm a picture consistent with Norwegian R&D policy to have been greatly focused on direct support in a way that includes incentives for collaboration with research institutes and universities. This is also linked to low levels of basic research, leading to a conclusion that public investments in knowledge are skewed towards higher education and applied, business oriented support, while basic research and graduations in science and engineering suffer.

It should be noted that these data are from 2000, before the introduction of tax incentives for R&D in 2002-2003 (see separate section). Still, the picture being presented in this graph should lead Norwegian policy makers to re-examine some of the emerging biases. While government activity is acceptable on several areas, areas to be rectified are in particular those that seem to be linked to low levels of capability and attractiveness of Norwegian firms, most notably employment and activity in business with higher levels of R&D (medium and high tech), production of science and engineering graduates, foreign direct investment, and innovation and R&D activity in the economy in general.

## **4.2. Perceived policy challenges**

### **4.2.1. A methodological note**

Our mapping of perceived challenges in Norwegian innovation policies is based on two data sources: 1) a survey carried out among actors in the policy system, as well as 2) an analysis of relevant policy documents. Although not providing a complete picture, the mapping exercise gives an overview of what is perceived to be the central challenges by both individuals and organizations across a wide spectrum of the innovation policy system.

#### *Survey*

In November 2003, a questionnaire was distributed to a total of 90 persons who work in organizations<sup>44</sup> that are involved in the development and implementation of innovation policies in Norway.

#### *Policy document analysis*

In addition to the survey, we have chosen to build our analysis on primary material which is eminently suited to our purpose. A significant collection of documents has been available to us in which key actors in the innovation policy system detail what they see as key challenges in the innovation policy system, what role their own institutions plays, and should play, and how specific issues concerning their own operations ought to be addressed. The documents are a response to the Ministry of Trade and Industry's call for contributions to and opinions on an overall revamping of the innovation policy system in Norway.<sup>45</sup> The following analysis is primarily based on a content analysis of this collection of documents.

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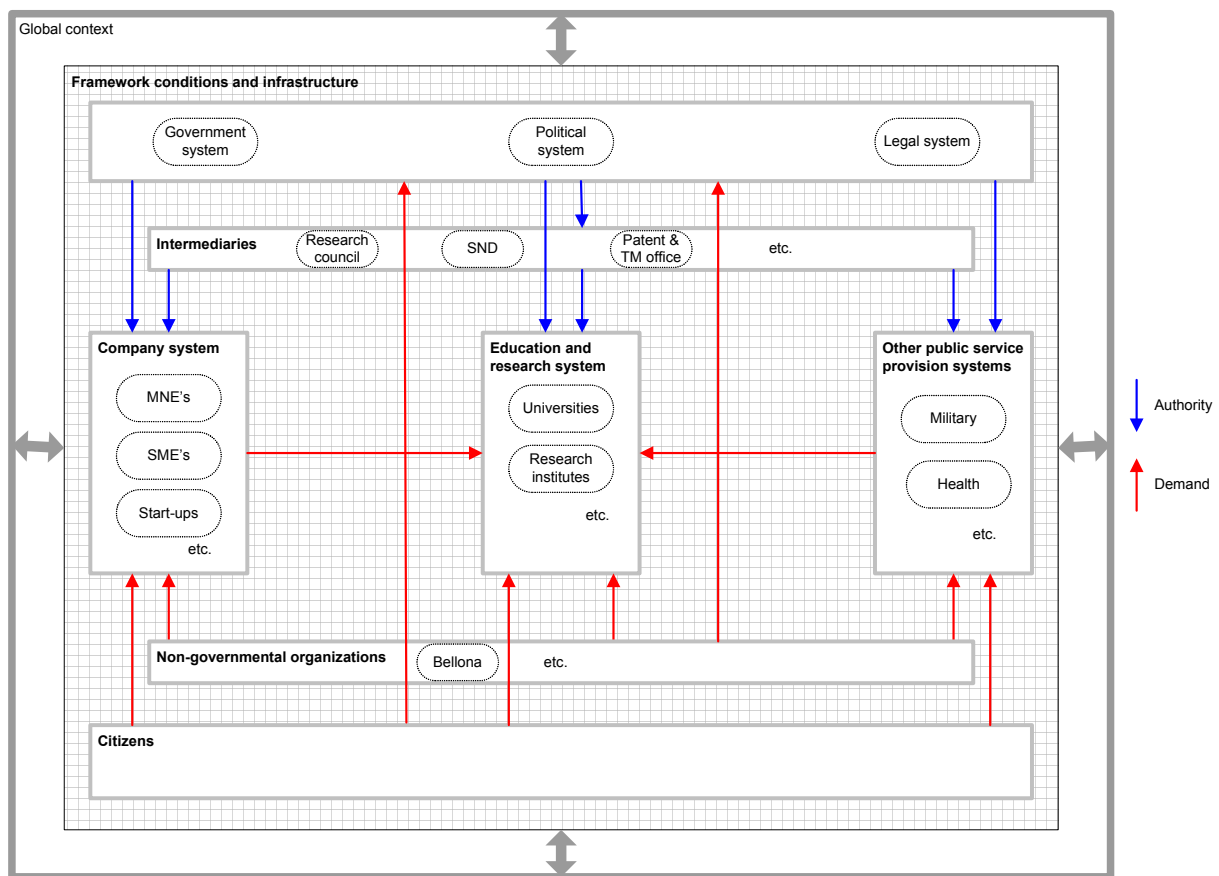
<sup>44</sup> Covering the Ministries of Trade and Industry; Education and Research; Local Government and Regional Development; Finance; Labour and Government Administration; Fisheries; Agriculture; the Research Council of Norway (NFR), the Norwegian Industrial and Regional Developments fund (SND), the Industrial Development Corporation of Norway (SIVA), and the Norwegian Trade Council. It should be noted that the SND and the Trade Council on 1.1.2004 merged with the Norwegian Tourism Council and the Norwegian Government Consultative Office for Inventors. See also appendix for the questionnaire (in Norwegian).

<sup>45</sup> The documents are referenced at the end of this document. At the time of writing, the documents are available at the internet address <http://www.odin.dep.no/nhd/norsk/p30000694/p30003208/024091-990021/index-dok000-b-f-a.html>.

## 4.2.2. Challenges

The various statements submitted to the Ministry of Trade and Industry are very different in both scope, length, as well as in the generality of the perspectives. Small institutions with particular missions address narrow issues, while the larger organisations such as the Norwegian Research Council (NRC) and State's Industry and Development Fund (SND) chose to submit voluminous reports addressing the broad issues concerning not only their own activities, but the overall structure and function of the Norwegian system of research and innovation.

**Figure 3: An actor oriented picture of the national innovation system (NIS)**



Here, we relate the central challenges that are highlighted in these statements to our map of the innovation system presented above, and we discuss these in the subsequent sections under the headings:

- General challenges
- Performance of the governance system
- Performance of the R&D and education system
- Performance of the company system
- Non-governmental organizations
- Citizens

We are not able to pay attention to specific issues concerning actors and opinions, to what extent opinions are shared or contested, what actors hold what positions, etc. In general, we portray the key issues that seem generally to be focussed in the debate, and that are generally considered relevant and important.

#### **4.2.2.1. General challenges**

##### *The shark's jaw*

The overriding concern among policy makers is what has been termed the shark's jaw. During the recent decades the Norwegian economy has been heavily influenced by the probably most successful innovation policy strategy in the post war era: The build-up of the petroleum sector. From the 1970s onwards this sector represented a change in the development path for the Norwegian economy, both in terms of the knowledge, technology and innovation generated and used in that sector (or cluster) as well as in its financial and fiscal merits. Measured in GDP, the trade balance, state revenues or public saving, this sector has been extremely important for the revitalisation and upgrading of the economy, but has also represented a potential threat, often referred to as the danger of becoming a "Kuwait" economy with heavy dependence on this one sector and a lack of economic diversification.

In short, the perceived challenge consists of uncertainty of future revenues for the state as well as a fading away of highly knowledge-based economic activities in time when public welfare expenditures, notably "pay-as-you-go" based pensions will soar. This is a long term structural challenge, and there is wide-spread political consensus that this challenge has to be met. It has recently prompted the Government to initiate a comprehensive policy or plan for innovation policy (see chapter 5).

##### *Framework conditions and infrastructure*

Judging from the documents reviewed, there is a rather broad agreement that the general conditions for pursuing innovative business ventures are relatively poor in Norway. Macro-economic policy is one concern. There is a need for restricting the use of oil revenues in order to curb inflation and in order to keep interest rates low. Contrasting the need for fiscal restraint, there is a broad concern about tax policies. Seen in isolation, tax levels are too high, and this, many believe, creates competitive disadvantages for Norwegian firms and hinders innovation and industrial growth.

Liberalization of trade and globalisation trends represents formidable challenges for many firms and industries in Norway. The challenge concerns new competitive pressures at home, but obviously also the successful migration of business activities to foreign markets.

Are the policy institutions, the R&D and education system, and the company system, able to cope? What should be done to strengthen actors in these systems so that they may prevail in the times ahead? Such questions are asked by many in the innovation policy system, and proposals are made for changes that will affect most of the subsystems and the interfaces in the innovation system. Collaboration, alliances, legal and institutional reform are among the issues most frequently mentioned.

The need for strengthening infrastructure for transport of people, goods and information is pointed out, and is seen as intimately related to the above issues. In a similar vein, the need for strengthening infrastructure for regional development is also emphasised. In order to create opportunities for innovation, business development and industrial growth around the country, there is a need to improve transport infrastructure, and to gear investments to the

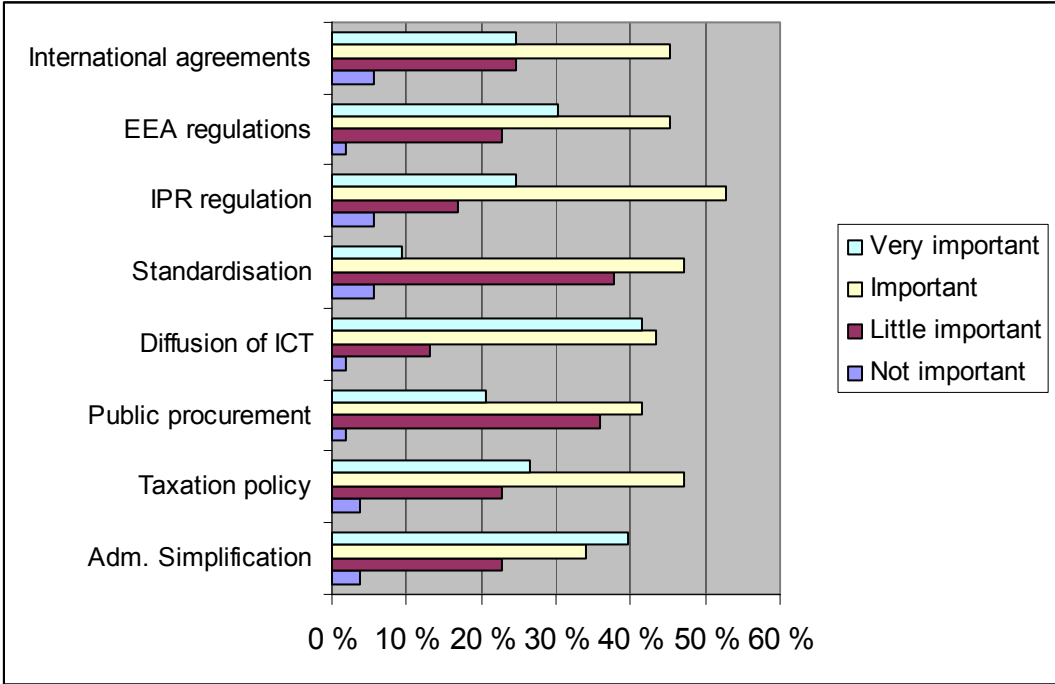


needs of innovation systems, rather than to focus on equal access to infrastructure of comparable quality in peripheral areas.

Broadband development and telecommunications infrastructure seems not to be of very great concern today. The privatisation of the public telecommunications systems is a thing of the past. Today, only one significant issue seems to be on the agenda: What should be the role of government with respect to promoting the development of broadband “information highways”? Should this be a sole concern of the private telecommunication companies, or ought the state play a leading role?

The results from the survey on the issue of framework conditions reveal a more simplified picture. The issues are all of importance, but the one that seem to stand out are in particular EEA regulations, IPR regulations, diffusion of ICT, taxation policy and administrative simplification. There is a notable difference between the two data sources on the importance of ICT, implying that this a contested area in the innovation policy.

**Figure 4: Perceived challenges on framework conditions**



*An insufficient level of spending on R&D and innovation*

The concern with R&D and innovation spending is a continuing theme in the innovation policy debate, from top to bottom in the innovation policy system. Nearly everyone seems to be in agreement that the low level of investment is a bad thing, and there is considerable debate concerning what ought to be done about this.

An ideological and professional dividing line demarcates two approaches to the issue. The dominating paradigm for dealing with the issue is economic, and addresses the problem with an economic vocabulary where terms such as market imperfections and additionality are key concepts. A core issue for proponents of this line of thinking is what is called “crowding out”. The question is: Do public activities, in spite of all good intentions, in effect replace private activities which would have been able to emerge if it weren’t for the public activities going on

already? Is there a crowding out of what could be normal economic activities, when government establishes itself in functions and roles that could just as well be filled by private firms?

On the other hand, there is a line of more systems oriented thinking which focus on systems failures (or bottlenecks) and which has a more pragmatic and evolutionary approach to innovation policy issues.

The two strands of thinking do not only lead to conflicting policy implications. All agree that there is a need to create incentives that help fostering research in industry, and more collaboration between researchers and people in industry. However, there is disagreement on the need for and the usefulness of direct measures targeting specific industries, technologies or firms. It appears that the systems perspective today increasingly is entering the scene in the policy system as a theoretically well grounded alternative to neo-classical economic arguments.

#### *Systemic flaws*

To what extent concrete systems mappings and bottleneck analysis can deliver what policy makers need, cannot yet be fully established. The fact remains, however, that the systems perspective has entered decisively into the Norwegian innovation policy debate. There is broad concern with the structure and function of the innovation system. In particular, there is focus on the key interfaces, and on the volume and quality of links between agents within and across subsystems. Issues that are raised in the debate concern, for example, the ability and willingness of people in business and academia to establish collaboration and alliances. Also, there is a concern with the ability of government institutions to collaborate strategically with actors in the company system. Further, there is concern with how much and how well different institutions in government are able to collaborate. Beyond this, there is, as mentioned earlier, very much concern with the ability of Norwegian firms and institutions to enter into collaborations and alliances internationally.

#### **4.2.2.2. Performance of the governance system**

The disagreements referred to above influence the policy debate to a great extent. Some feel a great need for bridging the gap, or at least for establishing a theoretical framework that could make it possible to establish a more solid scientific rationale for more direct and hands on policy action. In this perspective, and in line with the dictum that nothing is as practical as a good theory, some of the participants in the innovation policy debate are convinced that the performance of the policy system could be greatly improved, if only a better and more coherent theoretical rationale for policy action could be established. In reality, the large scale and ambitious reorganisation of the RCN as well as the SND (now part of Innovation Norway), build on opinions about what is necessary and important, for example with respect to needs for basic and applied research, that are not at all well grounded in theory and knowledge.

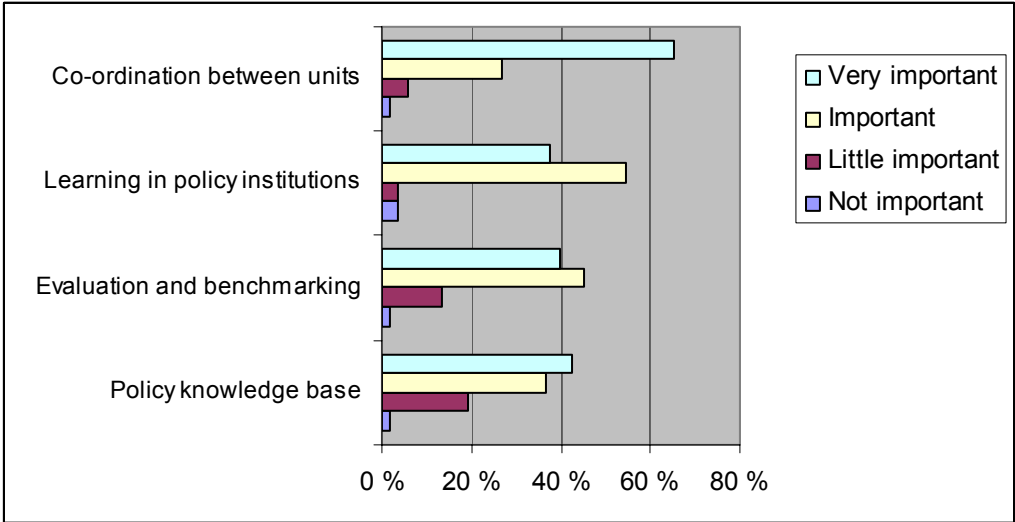
The systems oriented and the neo-classical economics oriented approaches do not always contradict each other, but they seem to lay the ground for distinct initiatives with respect to policy action. In general, economists play a very important role when analyses are concluded. There is, thus, a very strong tendency to see the introduction of market based and for-profit interactions (privatisation) as a necessary means to achieve greater effectiveness and efficiency in most areas of activity. In part, institutions are transformed by changing the

framework conditions within which they operate. Not seldomly, this transformation amounts to moving an agency from the Government sphere into the Company system. Less drastically, the activities of centrally placed bureaucratic structures are transformed by dividing them into smaller units, placing each unit in different regions, in effect, it is claimed, “moving the agencies closer to their customers”.

Finally, there is a current concern today with the overall structure of the government system, the coherence of decisions and actions, as well as the timeliness and rationality of decision processes. This concern is voiced by key players, not least in the ministries and at the level of Government Ministers. (The financing of MONIT project activities in Norway is a result of such concerns.)

There are clear indications of shortcomings in the policy or governance system, a fact that we will assess more broadly later in the document. Fig. 5 illustrates some of these issues. Both co-ordination between units in the same organisation and learning in policy institutions are seen as more important than the other two, although all four stand out as important. Still, we assess this indication that the Norwegian system may be better equipped with evaluation and benchmarking activities and a knowledge base than the capability to exploit them.

**Fig 5: Important issues in the policy system**



**4.2.2.3. Performance of the R&D and education system**

In the innovation policy debate, there is a concern with both the quality and volume of research being undertaken, as well as a concern with the way the investments actually being done in these areas pay off with respect to commercially successful innovation. Results depend on the performance of the company system, a fact we will return to in the next section.

The quality of disciplinary research has been a concern for a long time. Norwegian researchers do not publish sufficiently in academic journals, and many are preoccupied with why this is so, and what can be done about it. As will be pointed out later, the current government has embarked on a program of concrete policy action to promote higher quality in university level research. The task is ideologically problematic, as the principles of academic

autonomy and individual freedom for academics are potent rhetorical weapons against conventional approaches to management reform and organisational streamlining.

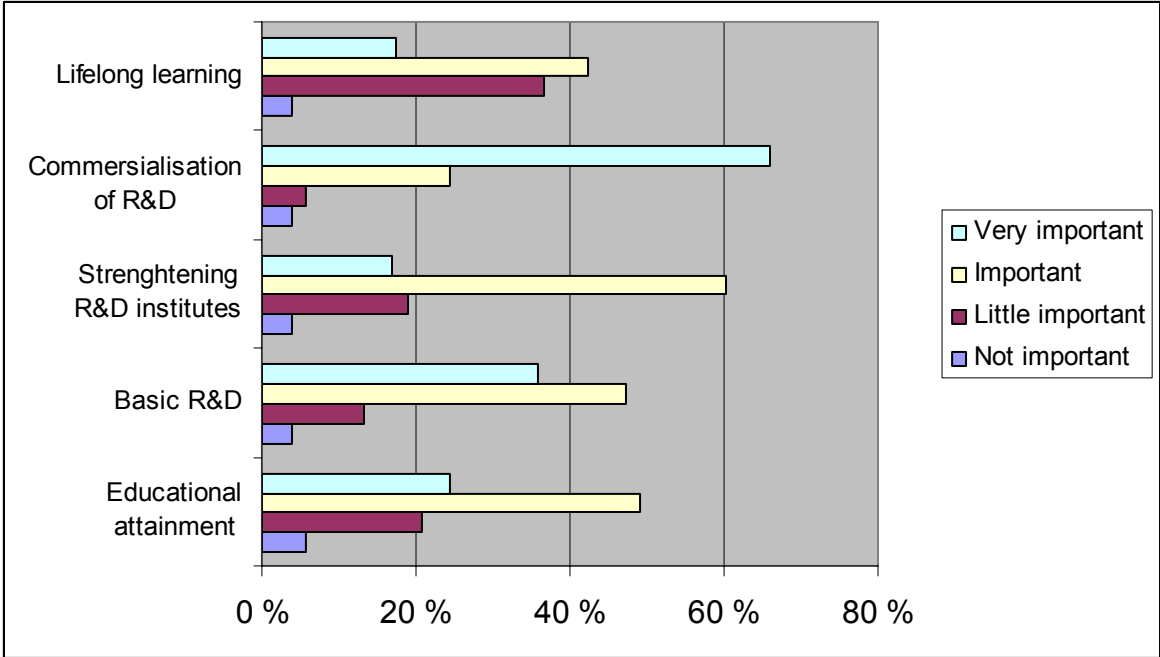
Another issue which is considered very important is the issue of size and structure of the public and semi-public research institute sector. Over the years, the institutes have increasingly been moved away from the system of government and public services towards the company system. Institutes have gradually had to deal with economic competition, in addition to the academic competition faced by institute researchers aiming at scientific publication. The institute sector is still large, public financing of the sector significant, and it is a key issue to decide on the future development path of this sector.

It appears unavoidable that further debate on this raises fundamental questions about roles, relationships and missions of the research institutes seen as elements in the larger innovation system. So far, little has been said about this.

The relationship between business and academia is a key concern, and many are critical to the ability of academic researchers and research institutions to relate meaningfully to firms, business activities and real life innovation processes. Academics are seen as being located too far away from milieus where commercial applications are being developed. This is not least seen as a cultural issue, but also as a clear result of institutional and individual incentive structures.

The broad picture above is supported by the results from the questionnaire. Fig. 6 shows that commercialization of R&D and educational attainment or improvements in the education system We assess the latter to be linked to the general discussion in Norway on the shortcomings of the educational system to provide quality education in natural sciences and engineering throughout the educational chain.

**Fig 6: Challenges for the R&D and education system**



#### **4.2.2.4. Performance of the company system**

The debate may be critical to the actual contribution of academic researchers to innovation processes, but it is no less preoccupied with the ability and willingness for firms to connect to advanced research in order to exploit the fruits of this effort. The industrial structure of Norway is considered to be a problem, in two ways: There are too many small firms in which the absorptive capacity with respect to science and research results tends to be very low. At the same time, the industrial structure of Norway has a bias in the direction of process oriented activities around exploiting raw materials and cheap energy. Not enough business activities are knowledge based, and more should be done, it is claimed, in order to develop such knowledge based industry in Norway.

The debate on performance of the company system does not seem at present to pay much attention to corporate governance. This relates to the fact that there is broad political agreement (in the policy system) to reduce the role of state ownership in commercial activities. This is a general view relating to the overall layout of the Norwegian innovation system, but it is also an issue which is seen as touching upon the company system in particular.

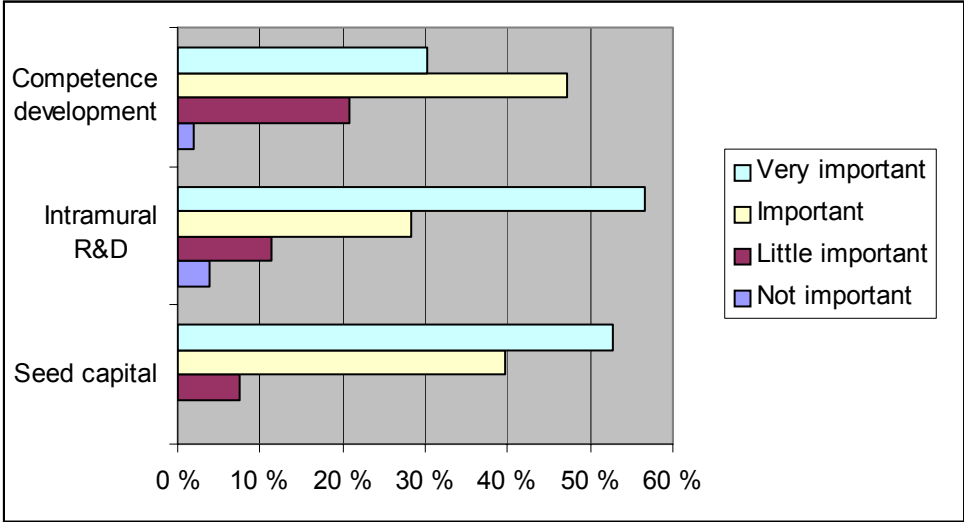
In general, framework conditions are considered essential. The push for privatisation in the sense of reducing state ownership, and in the sense of moving public agencies and services towards the Company system (corresponding to new approaches to public management), is very important today, at least in the political rhetoric.

Some steps are taken to improve innovation effectiveness for private firms, as well as the competitive environment. The debate on the need for a tax incentive scheme for allocation of resources to R&D, a scheme which has recently been implemented, is a sign of this. Taxation overhaul which would improve profitability of firms is argued to be another effective means for promoting the establishment of new firms and to promote an entrepreneurial spirit among citizens in Norway.

But several of the ideas and opinions on why the Norwegian company system is underperforming with respect to research and innovation run counter to this. Some of the themes brought up are the following: What can be done to counter the almost total lack of private venture capital which new firms experience today? What can be done to stimulate collaboration and networking between firms, and between firms and other institutions, inside Norway as well as internationally?

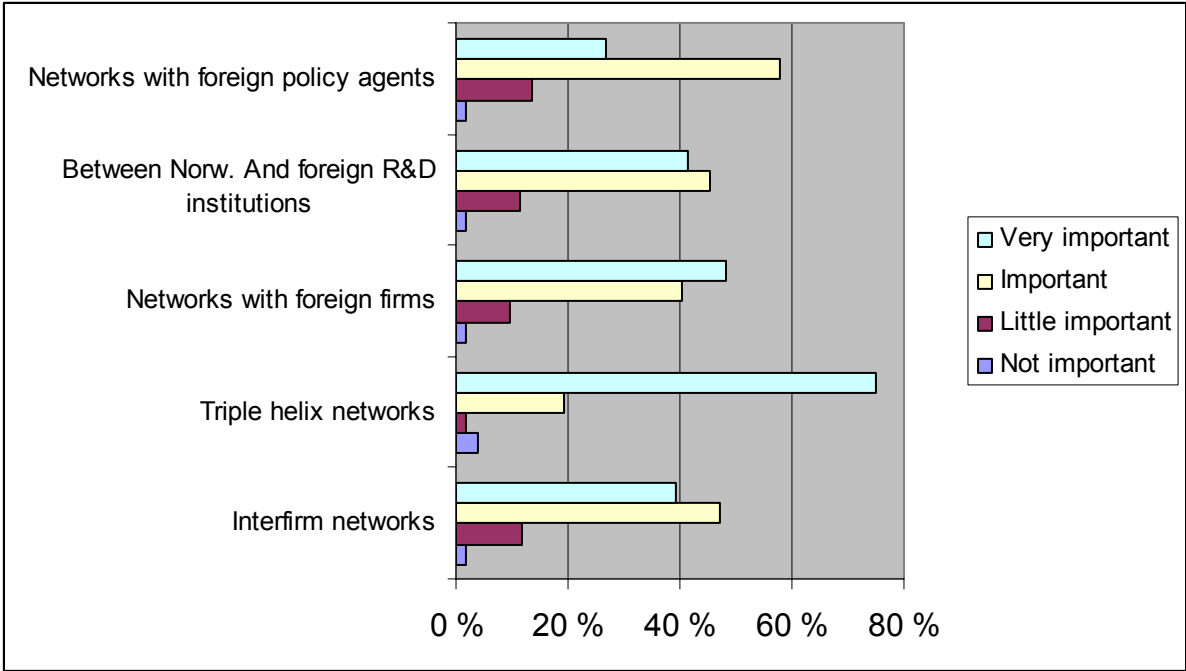
These are supported by the results from the questionnaire in fig. 7: Both the R&D performance and seed or venture capital stand out as severe challenges for the renewal of the private sector or the company system in Norway.

**Fig 7: Challenges for the company system**



An important component of the company system is its capability to engage in co-operation and collaboration with other firms or knowledge sources. This includes the capability for policy makers and public institutions to engage in networking to ensure their own learning. In short, networking is key to an innovation driven economy in times when the firm’s knowledge base is more widely distributed among private and public actors and sectors, and when the policy environment is getting more complex with important ramifications for policy institutions. Policy makers’ assessment of these challenges is presented in fig. 8, illustrating several dimensions of networking. What is here termed triple helix networks, i.e. between firms, R&D institutions and the public sector, are seen as extremely important and a challenge for the Norwegian system. Policy makers’ need to engage in learning across countries is also seen as an area to be invested in.

**Fig 8: Challenges for networking**



#### **4.2.2.5. Non-governmental organisations**

NGO's are critical elements in the innovation system, as they gather and focus popular demand for renewal both in commercial and non-commercial operations. It is an interesting fact that NGO's are not mentioned in the innovation policy debate that we have analysed.

#### **4.2.2.6. Citizens**

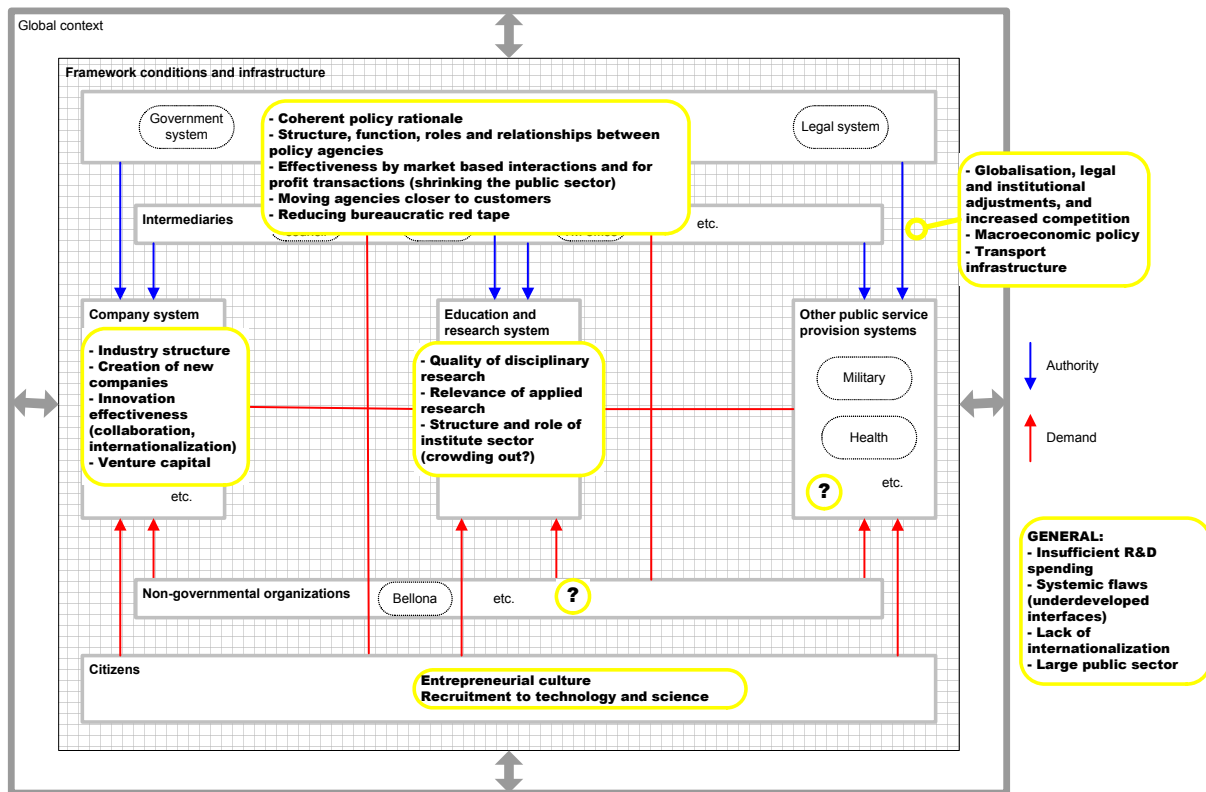
Citizens are focused on in two ways in the debate. First, by pointing out that a culture for entrepreneurship must take root in the population as a whole. Interest for and commitment to industrial renewal may well be seen as a cultural trait, and the role of the education system and other opinion formers in promoting such a culture is called for.

Secondly, citizens are seen as the most basic and essential of resources for innovation efforts, and the need to recruit and motivate the young to embark on studies and careers that are key to technological and other innovation efforts are emphasised.

#### **4.2.2.7. The overall picture**

A graphical representation of what we have found is presented below. In sum, the perceived challenges include some of the usual suspects, like low R&D funding, an industry structure not conducive to future needs of the economy, lack of venture capital and lack of entrepreneurship (start up of new firms with growth potential). However, beyond these there are several interesting issues coming up. In particular, we would like to highlight the focus on a lack of coherent policy rationale and the overall governance of the innovation policy area. This also leads to an awareness of the problems linked to the macro-economic policy, and implicitly the dominance it takes in the Norwegian policy environment. Notable are also transport and infrastructure as well as issues linked to globalisation and international competitiveness. Lastly, we note a clear awareness of weaknesses in the core education and research system, including basic research and the role of the research institutes in the innovation system. A general, long term threat providing a context to these perceptions is the future reduction of state revenues as discussed under the heading of the "shark's jaw".

**Fig 9: A summary of perceived challenges**



### 4.3. Policy mix

By policy mix, we understand the set of established priority areas and actual policy efforts within the field of innovation policies. First, current priority areas are identified on the basis of the latest Trend Chart reports for Norway<sup>46</sup> as well as recent policy documents such as white papers, government reports, action plans, law amendments, etc. Secondly, we provide a picture of the scale and direction of actual policy efforts by mapping the largest innovation policy measures by annual budget.

In conclusion, we provide a summary of the recent government proposition *Instruments for an innovative and creative industry*. The proposition is part of the Government’s plan to develop a new “holistic” innovation policy. Thus, the proposition - and the reactions to it in Parliament - gives us an indication as to how the Norwegian policy mix will develop in the future.

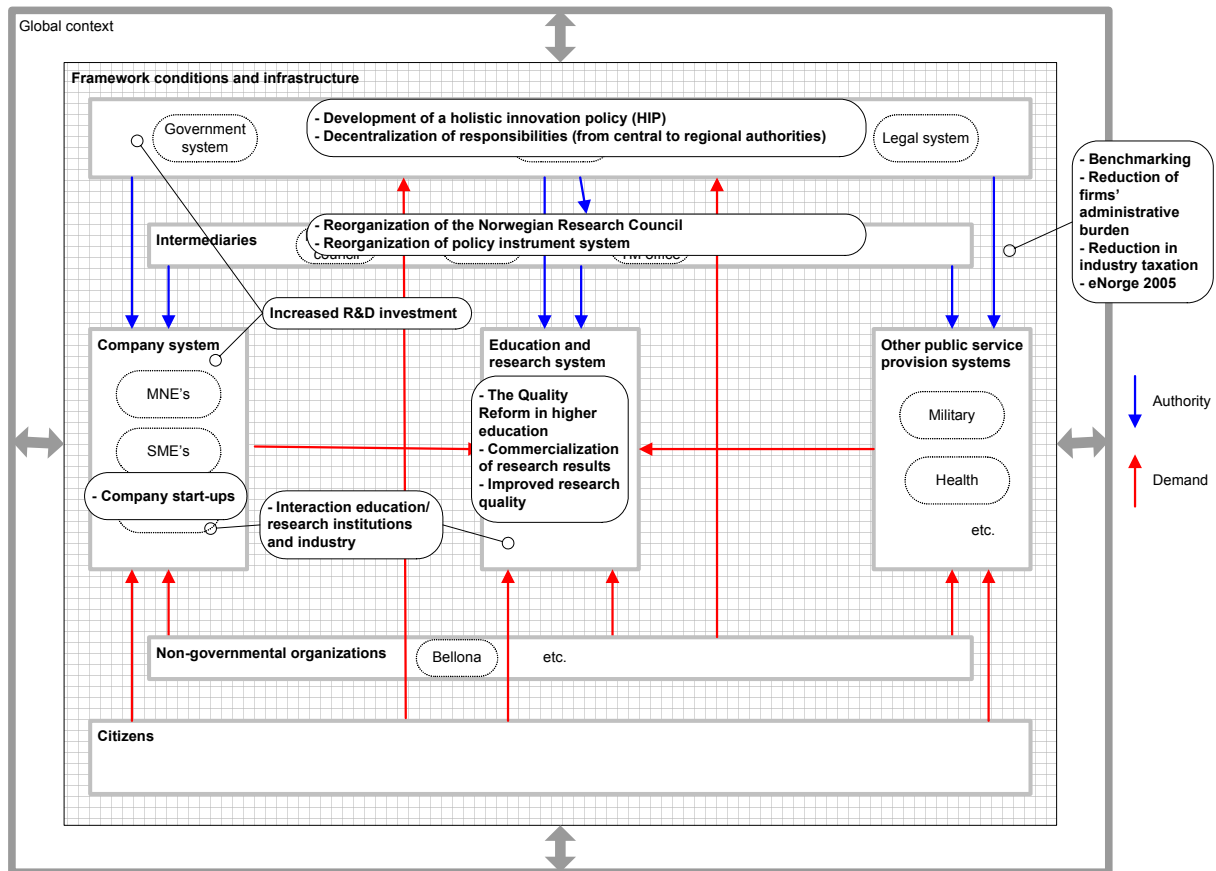
#### 4.3.1. Current priority areas

Figure 4. provides an overview of central themes in current Norwegian innovation policies.

<sup>46</sup> The reports contain a section on innovation policy developments, which accounts for the areas in which the focus and drive in innovation policies are concentrated.



**Fig 10: Current priority areas**



Against this background, it is possible to identify seven overriding areas in which the present interest and drive in Norwegian innovation policies is concentrated: the actual contents and organization of innovation policies; the general framework conditions for Norwegian industry; the scale and quality of national research and development; the quality of higher education; the commercialization of research results; the level of interaction between industry and institutions for education and research; and the scale of company start ups.

#### **4.3.2. Contents and organization of Norwegian innovation policies**

The development of a new holistic innovation policy (HIP) was initiated by the Minister of Education of Research in 2002 (see separate assessment). The new policy is to be characterized by a coherent understanding of traditionally separate policy areas in order to ensure an effective use of existing resources and to avoid that different policy measures are in conflict with each other or in other ways hinder innovation. The process has been placed under the leadership of the Ministry of Industry and Trade, but - as the main objective is to establish a horizontal, intersectoral policy - it involves other Ministries as well as actors outside the Government.<sup>47</sup>

<sup>47</sup> Koch, Per M., TREND CHART Country Report: Norway, September 1 2003

The process has hitherto resulted in an “innovation plan” entitled “Fra idé til verdi”, which was published on October 23rd 2003.<sup>48</sup> As part of the HIP process, the Government has also proposed a comprehensive reorganization of the business oriented policy instrument system.<sup>49</sup> The proposition is presented in more detail below.

Another recent effort concerning the organization of the Norwegian innovation policy system is the reorganization of the Norwegian Research Council (NFR) which came into effect in September 2003. The decision was made by the Government in 2002, and was for a large part based on an evaluation of NFR which pointed to weaknesses in the coordination of Norwegian research. The previous six “theme- based” divisions have been replaced by three “function-based” divisions:

- a division for disciplinary development
- a division for innovation and user-initiated R&D
- a division for strategic efforts

The new organization is to ensure that Norwegian research actively contributes to innovation and industrial development by facilitating interaction between on the one hand industry and the institute sector, and on the other hand basic and applied research.<sup>50</sup>

The delegation of responsibilities from central to local authorities is yet another current focus area touching upon the organization of the Norwegian innovation policy system. The Government is in favour of giving the counties more responsibility for resource allocation and development in the regions. Thus, the administration and allocation of innovation policy measures and funds are to be increasingly the responsibilities of regional rather than central authorities. This trend is discernable in the 2003 state budget where parts of the regional funding have been decentralized to the counties, who are free to use parts of this funding to finance innovation policy measures.<sup>51</sup>

### 4.3.3. Framework conditions

The appointment by the Government in 2000 of a Commission for Benchmarking (Referansetestingsutvalget) reflected an interest in improving the framework conditions for industrial activities in Norway on the basis of comparisons with framework conditions in other countries. The commission was to evaluate the use of benchmarking as a method and develop a system for the evaluation of the framework conditions for industrial wealth creation. In its report, the commission recommends that the Ministry of Industry and Trade - possibly in cooperation with other ministries - is made responsible for industrial framework condition benchmarking; that there should be established a reference group with the

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48 <http://www.odin.dep.no/archive/nhdvedlegg/01/09/fraid001.pdf>

49 St.prp. nr. 51 (2002-2003) Virkemidler for et innovativt og nyskapende næringsliv

50 <http://odin.dep.no/ufd/norsk/aktuelt/presse/045071-070067/index-dok000-b-f-a.html>;

<http://www.tu.no/arbeidsliv/article.jhtml?articleID=21680>; Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

51 White Paper No 31 (2002-2003), White Paper on Big Cities (St.meld. nr. 31 (2002-2003), Storbymeldingen); Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

responsibility for updating and development; and - with reference to the EU Lisbon-strategy - that benchmarking exercises should be held every second year.<sup>52</sup>

In order to increase productivity and efficiency in industry, it is a political goal to reduce firms' administrative burden. As part of a broader programme for the modernization of the public sector, the Government has introduced the action plan "Simplifying Norway". The plan is to provide Norwegian industry with a sound regulatory framework and user-friendly public services. Emphasis is placed upon:

- making the regulatory framework easily accessible
- improving regulations in targeted areas
- strengthening the knowledge base for decisions on new regulations and other government reforms
- reducing firms' reporting obligations
- making the public sector aware of the needs of industry

It is the Government's ambition that the quality of Norwegian public services is to give firms an international competitive advantage. An advisory forum with participation from the business organizations has been set up in order to secure a balance between the needs of industry on the one hand and society at large on the other hand. The Government is to present a revised and updated plan in the autumn of 2003.<sup>53</sup>

Traditionally, competition policies have not been an integral part of Norwegian innovation policies. However, stimulating the development of an innovative industry is presented as one of the motives for the action plan for competition policies which has been initiated by the Government. The action plan is part of the programme for modernizing the public sector, and the main focus is upon

- strengthening the position of the Competition Authority (Konkurransetilsynet)
- assessing laws and regulations in order to remove arrangements that may impede competition
- developing a public purchasing policy that promotes competition.<sup>54</sup>

Improving the conditions for value creation by reducing industrial taxes is a core issue for the present Government and a central priority in the 2003 state budget. 2002 saw the removal of the investment tax and an increase in depreciation rates. One central initiative in 2003 is the extension of the tax incentive scheme SkatteFUNN. Whereas the scheme, which gives tax

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52 <http://odin.dep.no/nhd/norsk/publ/utredninger/NOU/024001-020006/index-ved001-b-n-a.html>;

<http://odin.dep.no/odinarkiv/norsk/dep/nhd/2000/pressem/024041-070003/index-dok000-b-n-a.html>; Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

53 From words to action – modernization, efficiency improvement and simplification in the public sector (Fra ord til handling – modernisering, effektivisering og forenkling i offentlig sektor), report to Parliament from the Ministry of Labour and Government Administration, 24.01.02 (electronic version at <http://www.dep.no/archive/aadvedlegg/01/02/85128065.pdf>); Presentation of the action plan Simplifying Norway on the Government's web-pages (in English), <http://odin.dep.no/nhd/engelsk/publ/handlingsplaner/024081-220006/index-dok000-b-n-a.html>

54 From words to action – modernization, efficiency improvement and simplification in the public sector (Fra ord til handling – modernisering, effektivisering og forenkling i offentlig sektor), report to Parliament from the Ministry of Labour and Government Administration, 24.01.02 (electronic version at <http://www.dep.no/archive/aadvedlegg/01/02/85128065.pdf>)

reductions for industrial R&D investments, originally was targeted towards small and medium sized enterprises, it now applies to all firms - irrespective of size.<sup>55</sup>

eNorge 2005 is the Government's plan for IT policies for the period 2002-2005. The overriding goal of these policies is to exploit the possibilities offered by information technologies, the use of which is seen as an important impetus for societal change and improvement. eNorge has three focus areas:

- Value creation in industry: A strengthening of the development and use of information technology in industry is believed to contribute to value creation in industry by increasing innovation and competitiveness.
- Efficiency and quality in the public sector: The use of IT is to improve the quality and efficiency of public services.
- Participation and identity: The possibilities offered by IT are to be open to all citizens, and to be exploited in the conservation and development of Norway's cultural heritage, identity and languages.<sup>56</sup>

#### **4.3.4. Research and development**

Increasing R&D investments as a proportion of GDP is a central political objective. In 1999 investments amounted to 1,70 % of GDP, which is below the OECD average and the lowest share among the Nordic countries. The Government's goal is that Norwegian investments by 2005 as a minimum should have reached the OECD average. The State is to play a significant role in achieving this goal, i.a. by increasing the capital of the public Fund for Research and Innovation. However, the Government maintains that industry is to be responsible for 60% of the increase. The tax deduction scheme SkatteFUNN has been introduced as an instrument for increasing industrial spending on R&D.<sup>57</sup>

It is also the ambition of the Government to strengthen Norwegian research in qualitative terms. Several evaluations have indicated that the quality of the research being conducted is low, at least in some disciplines. One subsequent government initiative is the establishment of "centres of excellence" - research groups united under a common leadership which are given long-term financing based on a research plan. In addition, the Government wishes to increase the number of researcher recruits and to strengthen the funding of scientific equipment.<sup>58</sup>

#### **4.3.5. Quality in higher education**

The Norwegian system of higher education is presently undergoing major changes referred to as "the quality reform". Among the changes are

- the introduction of a new degree structure consisting of three levels: Bachelor (three years), master (two years) and Ph.D. (three years)
- the introduction of a new grades system

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55 Government proposition No 1 (2002-2003) The state budget including the Social Insurance Scheme [folketrygden]

56 <http://odin.dep.no/nhd/norsk/enorge/p10001876/024101-990129/index-dok000-b-n-a.html>

57 Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002; <http://www.skattefunn.no>

58 Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002; <http://www.skattefunn.no>

- the establishment of a new national organization for quality in education, NOKUT, whose main task is to evaluate the mechanisms for quality assurance in both public and private universities and colleges

The quality reform was initiated by the previous Labour Government in 2001, and has been followed up by the present Conservative-Centre Government.<sup>59</sup>

#### **4.3.6. Commercialization of research results**

It is a political goal that inventions based on publicly funded research should be commercialized, and hence exploited to the benefit of society at large. Universities and colleges have been given a legally based responsibility for promoting the practical use of scientific research results. In 2002, a government appointed committee presented its report on commercialization of results from university and college research. Based on this work, there has been a political process leading up to a recent amendment of the law on rights to inventions by employees. Unlike other employees, teachers and researchers at universities and colleges have hitherto had the primary right to patent or commercialize their own research results. The law amendment implies that this right is transferred to the institution. This is believed to result in the establishment of institutional structures which will ensure that research results are patented and made available for industrial use.

The political interest in stimulating the commercialization of research results is also reflected in several policy instruments. The FORNY programme aims at promoting commercialization of research based business concepts or ideas conceived at universities and colleges as well as research institutes. Also, the science parks actively help university and college researchers patenting, developing and marketing their inventions vis-à-vis industry.<sup>60</sup>

#### **4.3.7. Interaction between industry and education/research institutions**

Interaction between education/research institutions and industry is a central theme in Norwegian innovation policies. In the so-called “Government-platform” - a document which outlines the main ambitions of the present Government - it is emphasized that the knowledge transfer between universities/colleges and industry is to be strengthened.

A number of policy measures aim at increasing the links between research institutions and industry, e.g.:

- the user driven programmes, the objective of which is to actively involve firms in publicly funded R&D programmes
- the NT programme, which gives support to innovation in Northern Norway by i.a. developing networks of companies and knowledge institutions
- the MOBI programme, which aims at promoting innovation in firms i.a. through establishing links to research environments

<sup>59</sup> <http://odin.dep.no/ufd/norsk/aktuelt/presse/045071-070077/index-dok000-b-f-a.html>

Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

<sup>60</sup> Innst.O.nr.6 (2002-2003) (electric version at <http://www.stortinget.no/inno/200203-006-001.html>; Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002; <http://program.forskningsradet.no/forny/om/>

- Value creation 2010, which is to promote innovation at the regional level through strong interaction between industry and research
- Science parks, which are property-based initiatives with operational links to education/research institutions designed to encourage the formation and growth of knowledge-based industries<sup>61</sup>

#### **4.3.8. Company start-ups**

Facilitating company start-ups is an expressed political goal and a central motive behind the current restructuring of business oriented policy instruments and institutions. Today, there are several policy instruments oriented towards start-ups. Science parks play an important role in encouraging the establishment of new technology-based companies, as do the programme for incubator activities (in which science parks may participate) which stimulates the establishment of “incubators” – environments for the development of firms in the start-up phase. A related measure is the incubator grant scheme which provides financial support to entrepreneurs located in an incubator.<sup>62</sup>

#### **4.4. A summary of innovation policy measures**

This overview, illustrated in fig.11 below, confirms that the Norwegian policy mix has taken up the innovation systems perspective to a great extent, but, relative to the challenges perceived by many, fails to address some deeper concerns like industrial structure and globalisation. Still, some of the challenges are being met, at least in terms of political ambitions, like improved coherence and rationale in policy. The overall assessment is that the Norwegian system is capable to address proper challenges on the fringes, but fails to integrate and renew the foundations for industrial policy using perspectives from the innovation policy tool box and thinking. A number of areas are still challenges, as they have been over many years, like the institute sector and funding of R&D, without being addressed properly in the wider policy system.

#### **4.5. Looking ahead: the 2003 Government proposition on instruments for an innovative and creative industry**

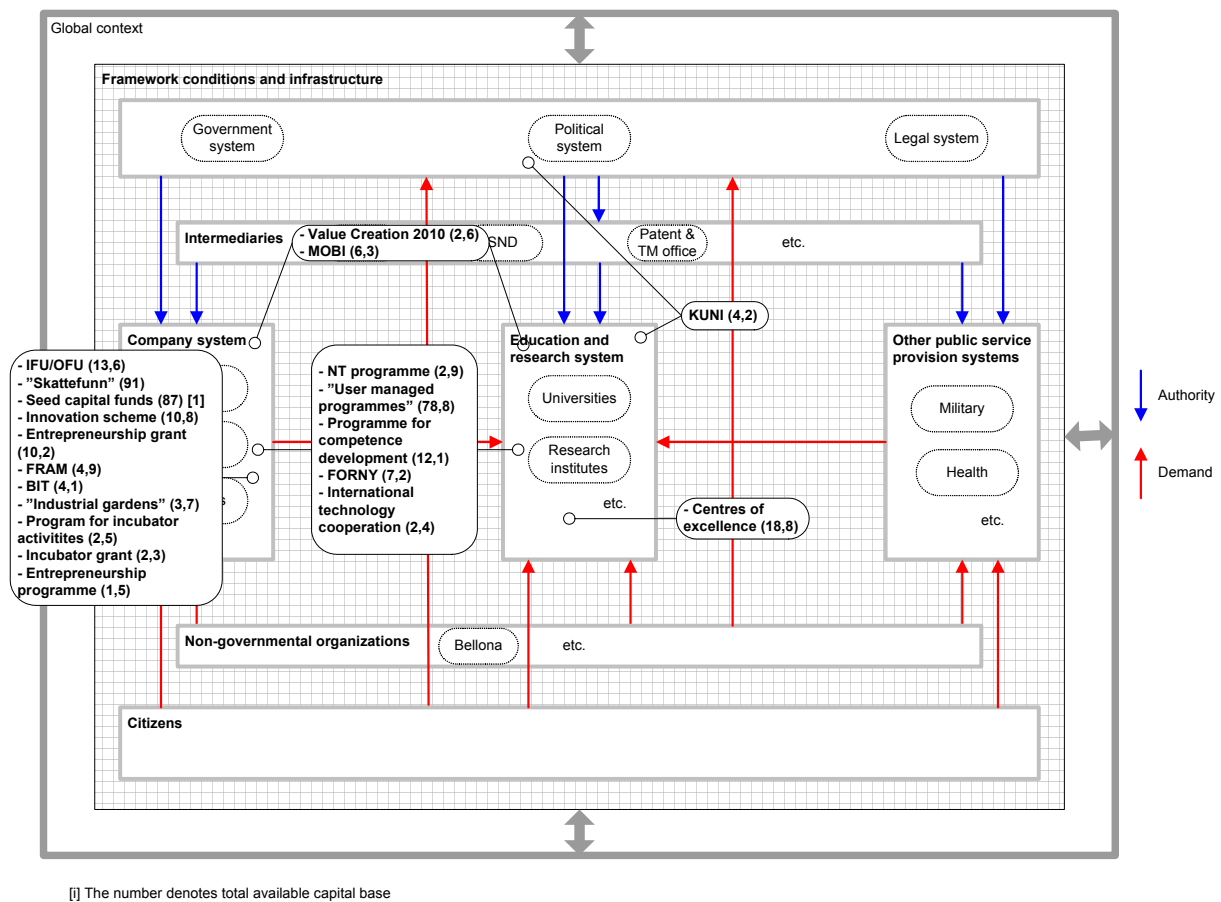
On March 28<sup>th</sup> 2003, the Ministry of Trade and Industry presented to Parliament a proposition entitled Instruments for an innovative and creative industry. In this document, the Government proposes a comprehensive reorganization of the business oriented policy instrument system, with the aim of making the system more efficient and better suited to facilitate value creation in Norwegian industry. The proposition is based on a review of the existing innovation policy instruments (Virkemiddelgjennomgangen), and is part of the Government’s initiative to introduce a new “holistic” innovation policy.

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61 Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

62 Koch, Per M., Monitoring, updating and disseminating developments in innovation and technology diffusion in the Member States – The TREND CHART: Norway, Covering period: October 2001-September 2002

**Fig 11: The 20 largest policy instruments**



According to the document, the policy instruments should increasingly be targeted towards the same goal, which should be to promote innovation nationwide. To achieve this, the instruments are mainly to focus upon the following three areas:

- research and competence development
- the idea, development and commercialization phases
- internationalization,

and to target the following five main groups:

- entrepreneurs
- young companies
- the innovation system
- small and medium sized enterprises with ambition and potential for growth
- researchers and R&D environments in industry and the research and education sector.

On a more specific level, the reorganization of the policy instrument or delivery system leads to the establishment of a new organization for innovation and internationalization by January 1<sup>st</sup> 2004. It is proposed that the new organization is to be represented abroad as well as domestically, and that it is given the responsibility for the measures presently administered by

the Norwegian Industrial and Regional Development Fund (Statens Nærings- og Distriktsutviklingsfond, SND), the Norwegian Government Consultative Office for Inventors (Statens Veiledningskontor for Oppfinnere, SVO) and the Norwegian Trade Council (Norges Eksportråd), as well as some of the innovation oriented policy measures administered by the Research Council of Norway (Norges Forskningsråd, NFR).

The suggested organizational form of the new unit is a “Special law company” (Særlovselskap). The company is to own and administer a network of offices all around the country, which is to provide a single “point of entrance” to the policy instruments and thus making them more easily available to their users. The main reason for organizing the unit as a “Special law company” is that such an arrangement allows for the necessary balance between the Government’s need for control on an aggregated level on the one hand, and the unit’s need for independence and freedom to make decisions on a day-to-day basis on the other hand.

Other proposals forwarded in the document, include an increase in the budget for regional funds from NOK 500 mill (€ 60,7 mill) to NOK 1 billion (€ 121,4 mill) and that the Norwegian Space Agency (Norsk Romsenter) is to become a more independent state institution (forvaltningsorgan med særskilte fullmakter).

The government proposition was discussed in Parliament on June 18<sup>th</sup> 2003, and was in general positively received. There was broad agreement on the need for increased co-ordination of the policy instruments, and that innovation should be a central goal.

Parliament was also in favour of the establishment of a unit for innovation and internationalization. It was however decided that the unit should include the Norwegian Tourist Board (Norges Turistråd, NTR) in addition to the institutions suggested in the proposition. Also, the possibility for including other institutions or instruments at a later point is to be held open.

While Parliament’s reactions to the proposition all in all were positive, a few critical comments were made. For one thing, some Members of Parliament expressed “a slight surprise” with the fact that decisions regarding policy instruments have been made before the actual content of the new “holistic” innovation policy has been established, pointing out that it would have been more rational to deal with the two matters in reverse order. Also, several of the parties in opposition argued that more attention should be paid to regional development, and that the objective of the policy instrument system should be to promote regional industrial activities in general, and not only activities that are related to innovation.



## **5. Agenda setting, prioritisation, and stakeholder involvement**

Innovation governance includes the capabilities to identify challenges ahead for the respective national economy, formulate strategic visions for future development, and prioritize resources accordingly. Agenda setting and prioritization are therefore key elements in the process of creating dynamism and inducing structural changes if that is perceived as necessary.

However, these processes do not take place in a vacuum. They are influenced by earlier agendas and priorities, inertia in building knowledge and preferences, stakeholders often representing existing priorities, and political and economic belief systems prevailing in the policy making system. The institutionalist approach taken in this analysis, as presented briefly in the introduction, assumes that agendas and priorities are not the result of rational, explicit choices, but depend on a numbers of formal, informal, structural and cultural factors. The analysis in this chapter aims at creating an understanding of how these influence the outcomes in the innovation governance system in Norway

### **5.1. A corporatist system in a macro-economic environment**

Norway's governance system has generally been based on a tri-partite relationship between the parties in the labor market and the state. For a brief assessment in the context of innovation policy, it is fair to say that the corporatist system has been strong, but limited. Nordby (1994) states that the corporatist governance system in Norway rests on three pillars:

- a) The tri-partite incomes policy, that is a division of labor with employers, trade unions and the state to ensure the competitiveness of Norwegian industry through moderate income settlements. This pillar also underlines the very way competitiveness has been conceptualized in Norway: low unit costs relative to competing countries. This was a high level relationship, but was indeed limited to a very narrow segment of the overall economic policy.
- b) The second is referred to as corporatism under public management, a key mechanism for agenda setting and stakeholder involvement. It refers to the system in which organisations and individual persons are invited to take part in commissions, committees, advisory boards etc. These entities typically deliver their assessments and conclusions on specific issues within the framework of "public studies" (Norges offentlige utredninger", see also section on policy learning). An important aspect of this form of corporatism is that the "owner ministry" giving the mandate for the commissioned work represent a deeply ingrained tradition in Norwegian public administration, the sector principle, implying that each ministry has all relevant responsibilities for policy actions within their respective domain. As such the link between sectoral ministries and this corporatist system reinforces divisions between policy domains and hence may lead to lack of policy co-ordination. It should be noted that a great many reforms and major policy decisions in the innovation policy field, like the recent tax refund system for R&D expenditures, the merger of five research councils into one in 1993, and benchmarking of Norwegian industry's competitiveness in 2002 have been initiated through such corporatist solutions.
- c) The final version is often referred to as inner corporatism, which is linked to profession based trade unions and their influence in public management (see Moen 2001).

This brief description deserves expansion on some key points. First, the committees and commissions referred to do not exercise any power in terms of decision making. Government, or the respective ministry, are totally free to accept, reject or change the implications as white papers and other documents are prepared for wider policy debate. This was e.g. the case during the reform of the research council system. Hence, these structures should be seen essentially as stakeholder mechanisms.

Second, the sectoral principle has led to processes within what has been coined the “segmented state” (Egeberg, Olsen and Sætren 1978) and “the negotiated economy” (Hernes 1978), implying a strong tendency to un-co-ordinated, but selective action vis a vis industries and interest groups. It is for example reflected in an old fashioned organisation of industrial policy whereby primary industries (fisheries and agriculture) still have their own ministries. This system prevails and is recognised in an extremely skewed distribution of government support to industrial activity: Of the total amount of support in 1998 of 18.5 bill. NOK, 12.4 bill. NOK were directed to agriculture, 4.8 bill. NOK to secondary and tertiary industries, and 0.7 bill NOK to industrially oriented R&D (NOU 2000:21; Moen 2002). More recently, an increasing tendency to implement reforms according to principles of new public management (NPM) has led to what is termed a “fragmented state” (see Tranøy and Østerud 2001). Reforms and governance lead to a swelling of agencies and other institutions mandated with implementation of policy, leaving the overall institutional design to fragmentation and co-ordination failures. A general assessment is that while the prime minister level has little power, the individual ministries much more so, the agency level has increased in authority and power due to the position in the policy cycle. An additional conclusion from the recent power study was that even the recent reform processes of state institutions itself have been sectoral and un-co-ordinated (NOU 2003:19).

The key point in this analysis is that the Norwegian policy making system lacks a co-ordinating body or mechanism ensuring broad and strategic decision making across the domains of individual ministries. It is mirrored by a policy making platform that may be termed the “macro-economic rationality” (Koch 2003). Compared to other countries, this macro-economic rationality has been particularly strong, based on the “iron triangle” of the economist institutions of the Central Bank, Department of economics at the University of Oslo and the Ministry of Finance. Starting out as a strong element in labour party governmental planning, it has only increased its role in policy making with the stronger tendency to rely on market solutions and economic liberalism in recent years. Industrial policy as such has been more or less removed from the agenda to the benefit of a market failure approach to especially capital markets. Industrially oriented policy is best left to the Ministry of Finance (Moen 2002). On top of that, the role of the state is now characterised as state capitalism without strategy, except selling state shares in major corporations (NOU 2003:19).

## **5.2. The politics of agenda setting**

Agenda setting basically takes place at the political level. In this section we explore briefly some key aspects of this. Although the term political level usually refers to politicians and political parties, patterns of tension and conflict typically cut through many layers and institutions.

### 5.2.1. Multi-dimensional tensions

Relative to the emergence of comprehensive innovation policy, several dimensions of partly deeply ingrained tensions influence the Norwegian system. A point of departure is the notion of the dominant “macro-economic rationality” alluded to above. Although this dominant feature of Norwegian policy making has existed during most of the post-war era, in particular in the 1960s and 1970s with Keynesian economic policy, it has become even more dominant over the past 20 years due to two factors: First, the petroleum sector has generated not so much energy for the Norwegian economy as financial assets. From early on a perceived challenge has been to avoid the dangers of a Kuwait economy identified as one being deeply dependent on oil and gas based revenues and activities. The financial assets were therefore defined as oil and gas reserves transformed, and put aside as savings. The strong capabilities of the economists community in Norway has been a stronghold and a competence asset in the management of these resources. Second, a cross-political preference for new public management (NPM) became pervasive over the past 10-15 years, including a market oriented focus in economic policy, privatisation of suitable public services and a stringent, even ideologised, view on the interface between the state and the market.

As new perspectives on innovation policy emerge, several lines of tensions become visible in the political and policy making system:

- a) The conservative party, Høyre, currently leading the government coalition, is split between a traditional or neo-classical economist view and a more pragmatic stance. Still, innovation policy is a difficult issue in Høyre, as it challenges the role of the state in economics and politics.
- b) The Labour Party has tensions along the same lines, but less severe. The party is also more pragmatic than Høyre on the role of the state in the economy, in particular state ownership. The party is also strongly linked to the trade union movement.

These tensions provide a vital background for the fact that a modernised version of industrial and innovation policy is very difficult to achieve. Further, these tensions are reinforced by similar rifts in the civil service:

- c) There are deep tensions within the Ministry of Trade and Industry, basically between the division for economic policy well founded on the neo-classical approach to economic policy, and the division for R&D and innovation that has assumed a perspective more in line with the innovation systems approach and evolutionary economics.
- d) There are tensions between the Ministry of Trade and Industry and Ministry of Local Government and Regional Development, in particular on the question of state vs regional perspectives.
- e) The Ministry of Science and Education takes up an ownership role for R&D policy and remains resistant to being (too much) co-ordinated. It led, as will be shown for the new Government Committee for Innovation Policy RIU (see chapter 6) to a lack of integration between R&D policy and innovation policy.

Hence, there are two dimensions of conflicts related to economic and innovation policy, on the one hand an academic-economic dimension, and on the other a political-economic dimension, both reinforcing each other and making a well-informed modernisation and renewal of the interface between economic and innovation policy very difficult.

## 5.2.2. Processes in Parliament

As mentioned above, the Parliament is the high level policy formulation body and has therefore an overall policy function. We cannot include all kinds of proceedings taking place in the Parliament in this paper, but some key mechanisms and process are important to be able to understand the system as such.

First of all, the Parliament divides itself into 12 standing committees as described above. The Presidency decides on how this is done, but the rule is that the committees should have a reasonable workload, a rule that necessarily leads to trade-offs concerning which get what for political treatment. For example the Standing Committee on Science and Education (SCSE) has responsibility for the R&D budget. The Standing Committee on Trade and Industry (SCTI) has responsibility for three ministries (all industrial), and will according to the procedural system leave major R&D affairs to the former. These trade-offs are well illustrated by the way the yearly state budgets are treated. The state budget, with its resource allocation and prioritization, is the key vehicle for policy formulation. However, due to the division of labor between the committees, they may not have the whole budget for a sector for treatment. For example, the Standing Committee of Trade and Industry will not treat the chapters of the budget for the Ministry of Trade and Industry that deals with R&D allocated for use outside that ministry (for RCN). Those chapters will be dealt with in the Standing Committee for Science and Education. This seems at face value to represent a co-ordination failure, since an important instrument in industrial and economic policy is R&D. This seems even more to the point in so far as the SCTI does not formally attach comments for priority for the subsequent treatment in SCSE. But the SCSE is then responsible to prepare the discussion in parliament.

This cross-functional system could not operate without the co-ordinating role of party groups. Before preparing the final proposals for discussion in Parliament, the issues at stake are discussed broadly in the respective parties, allowing them to instruct or inform the committee delegates to vote or push for specific positions and priorities. Hence, the party groups operate as cross-references in the system. In other words, the organisation of parliament as such does not necessarily indicate how positions are being formulated. It is the party machinery that has opinions through the committees, while these are not decision making bodies in their own right. For example, as is the case in Norway, the treatment of industrial R&D budgets for RCN in the SCSE and not in SCTI often leads to competition between basic, university research and more applied industrially oriented research. Seen through the budgets for industrial R&D over the 1990s, there has been a clear trend that industrial R&D lost out (RCN yearly report 2002). The typical sectoral principle of responsibility is broken leading to a weak link between industry and R&D. In addition, there is an implicit abdication of political responsibility vis a vis RCN, the receiver of these funds. Not without some truth, many people refer to this situation as having the kinder garden teachers in SCSE deal with important policy issues for industrial development.

Contrary to some countries, these committees do not have joint meetings to better co-ordinate policy. On the other hand, some important cases may be treated in more than one committee, a matter that is decided by the presidency. Still, the committee system is vulnerable to the competence of party delegates and the level of information and knowledge among these. In addition, delegates, or members of Parliament, may also operate individually as allowed by the parties, or individually according to specific procedures in the parliamentary agenda.

The latter is best illustrated with the proposal to establish a new regional loan facility for industrial development for the year 2003. One MP, Inge Ryan from the socialists, forwarded

an individual proposal for the facility, after which the Parliament entered into a compromise with the government resulting in total financial limit of 1 billion NOK. The regulations for the new facility, or fund, were established by the Ministry of Trade and Industry in consultation with other ministries. No clients and relevant agencies were consulted. During the process, Mr Ryan was asked to reduce the overall limit of the fund and instead achieve a higher loss threshold. This was not done, and the Ministry of Finance, concerned about the balance of the budget, cut the loss threshold to 15% from 25%, thereby deciding through a zero-sum game to implement a fund for which no client has any use. The 2003 limit of 500 mill NOK was exploited only with 146 mill NOK (Mühlbradt 2003).

A co-ordination challenge also arises from the type of instruments in various ministries' portfolios. For example, the Standing Committee of Finance Policy (SCFP) will discuss policies that are of key importance for the SCTI, but since the former, through the contents of finance policy, handles all financial instruments, like tax policy, a coherent treatment vis a vis industry and innovation is extremely difficult. This case also illustrates that the division of labour in Parliament has a multi-dimensional co-ordination problem: Firstly through various policy fields being distributed across the committees according to the "fair burden" principle, and secondly through the fact that various instruments are distributed across committees.

For a coherent and horizontal innovation policy this situation becomes extremely difficult, and a rational process is hence dependent on insightful processes in and among political parties and their delegates. The organisation of parliament is ill suited to broader, strategic approaches in areas like innovation policy. In fact, if the government is to have success in establishing a comprehensive innovation policy, it needs to be extremely sensitive to important positions taken by the opposition in parliament to be able to achieve negotiated outcomes.

### **5.3. Prioritization in R&D: The role of ministries and RCN**

Prioritization takes place through state budgets which we technically discuss in the next chapter as a co-ordination mechanism. Here we focus on the more policy relevant decision making system.

As alluded to earlier, the ministries have great autonomy in the context of a weak prime minister level.<sup>63</sup> They operate according to the principle of sector responsibility, which says that each ministry shall be responsible for their own R&D strategy according to their own knowledge needs. Typically, the ministerial strategy shall include a definition of the boundaries of responsibilities and strategies for exploitation.

The key ministry is the Ministry for Science and Education (see also chapter on co-ordination). But prioritization takes place within each ministry. This process is linked tightly with implementation as each ministry delegates the implementation of the priorities to the key agency, the Research Council of Norway, the dominant and almost omnipotent agency in the STI domain. Hence, the prioritization takes place within the "contract" between the ministries and the RCN on a yearly basis (see section on state budgets). The process is a combined top-

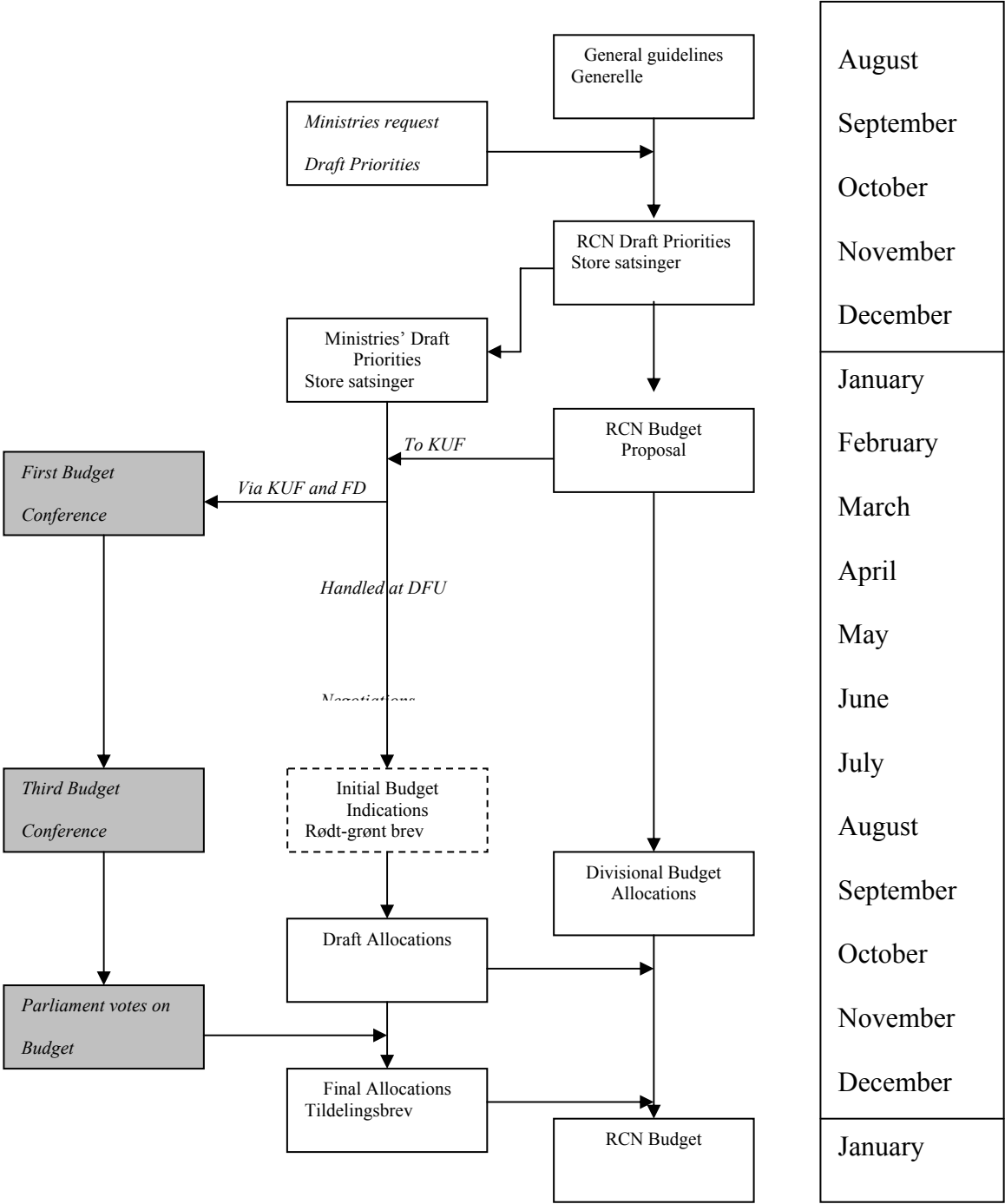
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<sup>63</sup> It is said that a main reason for this stems from the period under Danish rule, where the Danish king was afraid of possible opposition from a strong prime minister and government, and hence ensured to weaken the office of the prime minister and made the ministers autonomous and divided (a version of the well known split and rule doctrine).

down and bottom up, in which priorities stemming from strategic processes with RCN are interfaced with ministerial priorities. This is depicted in fig 12 which gives an overview.

The main points to be made here is that the prioritization processes take place without formal exercises like foresight etc. The main priorities from government are typically laid down in white papers, which in the Norwegian system substitutes other strategic intelligence functions. But these are loose visions and objectives with no binding impact on yearly allocations. Hence the prioritization process is very much linked to the yearly budget.

**Fig 12: RCN Budget Process Overview**



Source: Research and Innovation Governance: A study of eight countries. Technopolis 2003.

However, the main feature in the system is the principle of earmarking, as ministries in their prioritized allocations to RCN in a very detailed manner instruct the use of the funds. Six ministries provide the general funding base for RCN, which together with financial means from the new Fund for R&D and Innovation, makes up 75% of RCNs financial base. The rest is provided by dedicated funds from 14 ministries, in many cases with very small allotments (down to less than 1 mill euro). The RCN is therefore very much reduced to an implementing institution rather than the strategic institution it was meant to be. A recent study of this earmarking system highlights the fact that while the Norwegian governance system in general rests very much on new public management principles, the earmarking system is a very evident contradiction (Technopolis 2003). The overview over the styles of various ministries (see table 1) is summed up as follows:

**Table 1: Ministries' Earmarking Styles**

	Spend with RCN	Allocation basis	No of categories	Biggest category (MNOK)	Smallest category (MNOK)	MNOK/ category	No of earmarks	Smallest money earmark (MNOK)	Categories + earmarks	Degree of Ear-marking
<b>KRD</b>	101	P	12	45.2	1.5	8.4	10	0.45	22	H
<b>OED</b>	249	<i>V</i>	4	70.0	34.0	62.1	14	<i>ns</i>	18	<i>L</i>
<b>SHD</b>	99	P	20	21.8	0.3	4.9	4	2.00	24	H
<b>LD</b>	251	<i>Strategy/P</i>	20	31.8	0.1	12.5	32	1.50	52	<i>H</i>
<b>NHD</b>	848	<i>V/theme</i>	17	165.0	2.9	49.9	17	2.00	34	<i>L</i>
<b>KUF</b>	765	<i>V/theme</i>	8	208.0	43.0	95.6	20	0.85	28	<i>L</i>
<b>FiD</b>	180	<i>strategy</i>	47	24.2	0.1	3.8	12	<i>ns</i>	59	<i>H</i>
<b>FIN</b>	8	P	10	3.3	0.1	0.8	1	0.05	11	L
<b>UD</b>	39	P	12	11.7	0.2	3.2	0	0.20	12	H
<b>SD</b>	53	P	4	11.0	0.3	13.2	3	1.50	7	H
<b>MD</b>	194	V	5	102.0	27.0	38.7	37	1.00	42	H
<b>Total/A vge.</b>	2785.1		159	208.0	0.1	17.5	120	0.05	279	

**Note:** Allocation basis: P = programme; V = type of funding (*virkemiddel*). ns = not specified. Ministries providing general funds are indicated in *italics*

**Source:** Technopolis 2003, based on *Tildelingsbrev* 2000, except FiD, 1999 and FIN, 2001. KUF earmarks relate only to special funds

“Smaller spenders tend to discuss their funding of individual programmes. Rather than **supporting** various categories of activity, they treat RCN much more like a supermarket, buying a packet of this here, a slice of that there – essentially for their own consumption. They are also much more likely to earmark **within** individual programmes, and these earmarks can relate on occasions to quite small amounts. From the allocation letters, it is clear that these earmarks represent a mixture of politically imposed requirements and ministries' needs for very specific pieces of research. In isolated cases, it seems that the level of control desired by the ministries is extreme.

The agriculture (LD) and fisheries (FiD) ministries have a behaviour of their own. As former owners of research councils, they have a more developed set of internal definitions of needs

than most ministries, and these are articulated in strategies. Their allocation letters refer to these strategies in a general way, but the effect is to make the instructions to RCN highly specific. It is as if their management style has not adjusted to the new situation, so that the real management of RCN's BF division is contested. The detail and complexity of the agriculture ministry's micro-management in the past is illustrated by a letter<sup>64</sup> from the general audit office to RCN, which proposed an 80-point agenda for a meeting intended to review whether RCN had complied with all the instructions contained in the agriculture ministry's 1999 allocation letter to the council. The environment ministry is in a somewhat similar position. While it never formally owned a research council, the Norwegian National Committee for Environmental Research had, in practice, worked as the environment ministry's research council for a period before the RCN merger. The environment ministry therefore acts in a similar way to the ministries of fisheries and agriculture, with a high degree of formalisation of its needs and with very specific earmarking of funds."

Several analytical points may also be made in the degree of variation in behaviour (ibid):

- "The **purpose** of the funding – whether it is fundamentally paying for research to be done or whether it is paying for answers to the ministries' questions – or, in other words, whether the funding provides patronage or custom. Often, the two are not clearly distinguished
- The **scale** of the funding. Small funders trust RCN less and earmark more
- The **history** of the ministry. Those who have owned sectoral research councils in the past still deal with RCN at a level of great detail
- Intensity of **political demands** of the sector. Some (such as regional development) are simply more prone to lobbying and political interference than others
- Variations in the degree of **personal interest and competence**, especially at the level of the responsible officers in the ministries"

Hence the sector based governance system is deeply ingrained in the way priorities are made, and undermines a broader strategic agenda setting for R&D and innovation policy. The control exercised may more readily be termed negative than positive, it implies a significant weakening of RCN strategic elbow room and potential to broader and long term policy deployment.

As mentioned, the Ministry for Science and Education is a major player in general R&D policy as well as education policy. It funds some 25% of RCNs yearly budget (in 2003). But given the fact that R&D and education are both core areas in innovation policy, one may also expect that these two areas in the ministry are highly co-ordinated to represent a coherent policy.

This is not the case. It may be illustrated by the discussion of the research institute sector in Norway. Currently, Norway, after the privatization of major parts of the institute sector, has some 200 small and large research institutes, mostly organised as private foundations. These are linked to the public R&D policy through a system of basic and strategic funding. The point here is that the recent and current debate point to the possibility of this sector being to big.<sup>65</sup> The R&D department of this ministry has typically held that position. However, by recent policy developments, universities and colleges have been met with increasing demands for more external funding aside the funding received from the ministry. This has led the institutions in many cases to establish their own applied R&D institutions generally in

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<sup>64</sup> *Riksrevisjonen* letter from Per Scott and Maggi Vineshaugen Rødviik to RCN, dated 3 March 2000, reference S.2 2000/627 MVR/WSC

<sup>65</sup> This debate tends to overlook the fact that many countries have a similar size, but organised as units of public institutions and therefore more invisible in the institutional landscape.



competition with the research institute sector. The development has been encouraged by the other main department in the ministry, the department for universities and colleges. Hence, it is fair to say that the left hand does not know what the right hand does.

The story behind this seemingly lack of co-ordination is in simple terms as follows: Through the late 1990's the political pressure for increased external funding for universities and colleges increased, partly to enhance their economic vitality and reduce the dependence on public funding through the state budget. The department for R&D affairs observed that this would lead to contradictions in the institutional as described above, but chose to downplay the possible internal conflict in the ministry. This was done to better engage in the struggle with the Ministry of Finance as this was seen as more important for overall R&D policies. Further, there is an important difference between the two sister departments, as the R&D department has its roots and rationale in developing R&D policy, but had no administrative responsibility for external institutions. The department for universities and colleges, on the other hand, was established with the explicit rationale to ensure the administration of the external institutions. It was preoccupied with the task of managing the resources for these institutions, and hence took on the role of being the protector of them. Currently, the division between the two has been reduced, but the example about the consequences of external funding illustrates very well how policies interact, and how easily they may be left un-coordinated.

#### **5.4. Innovating a new policy: The case of the tax credit scheme**

The dynamics of policy making often take place within the context of tensions between policy agendas or orientations. This was certainly the case in the development of the SkatteFUNN or the tax credit scheme (see Kaloudis 2004 for a complete analysis). The market model of conservatives or liberals has typically been opposed by the welfare model of the left. The tensions that often arise concerns whether to choose market models in promoting R&D investments, i.e. using tax breaks, or relying on direct measures through R&D support programmes. In addition this, there is often a tension concerning the use of the tax system for various purposes in general, often not following strict part lines.

##### **Box 1: What is SkatteFUNN?**

SkatteFUNN is a tax credit measure for enhancing R&D investments in Norway.

- Small and medium-sized firms (SMEs) are the primary recipient of this measure, with the right to claim 20 per cent of their expenses on internal R&D-projects within a predetermined baseline of 4 million NOK each, or 8 million NOK if the R&D project involves collaboration with an approvable R&D institution.
- From 2003 all businesses are eligible to receive tax credits.

The Research Council of Norway (RCN) has to approve that the project falls within the definitions of an R&D activity.

Chronologically, the history of introduction and implementation of SkatteFUNN in Norway may be divided in three periods:

1. The first period started officially with the nomination of an expert commission (Hervik-commission), 23<sup>rd</sup> of March 1999, with a mandate from the Ministry of Trade

and Industry (NHD), in collaboration with the Ministry of Finance (FIN) and the Ministry of Education, Research and Church Affairs (KUF) to assess measures to enhance R&D-activities in Norway. This period ends on 8<sup>th</sup> of March 2000, when the committee's final report was formally delivered to the minister of NHD.

2. The period after the 8<sup>th</sup> of March lasts until the implementation of the measure in October 2002. This period is characterized by intense policy maneuvers about how the suggestions from Hervik-commission may be implemented. Initially, under the period of the Labor party minority government (government Stoltenberg), a measure for subsidizing firms' purchase of R&D services from R&D institutions with a predefined budgetary limit (FUNN) was introduced in 2001. During the period 2001-2002 competing agendas of political parties and a shift of government in October 2001 (Bondevik II) resulted in the phasing out of FUNN and in the introduction of SkatteFUNN. Inputs and initiatives from the responsible ministries, in particular FIN, KUF and NHD played also an important role in shaping the FUNN and SkatteFUNN.
3. The period after the implementation of the SkatteFUNN is characterized by a period of adjustment. As predicted by the Ministry of Finance, businesses immediately embraced the SkatteFUNN measure. R&D tax credit claims in 2002 surpassed 700 million NOK. In comparison, the entire budget of the Research Council of Norway for stimulating R&D and innovation in 2002 was about 600 million NOK. On the other hand, because of the popularity of SkatteFUNN, the tax revenue loss for the Norwegian state has been understood as considerable. This triggered the need to limit funding to direct measures for enhancing R&D and innovation as a response to the principle of an austere fiscal policy due to the phasing out of oil revenues (handelregelen)

The main recommendations of Hervik-commission were:

- The introduction of a new tax-credit measure enabling small and medium size firms to claim a deduction of a 25 per cent of maximum 4 million NOK R&D expenditures from their tax bills. This upper limit can increase to 8 million NOK if the R&D-project involves collaboration with an R&D institution. In case of negative balance sheet, companies receive an allowance equal to the tax credit. The Research Council of Norway (RCN) has to approve that the project falls within the definitions of an R&D activity before the firm has the right to a tax credit. There was a disagreement in the commission about whether the new measure should be practiced as tax credits or as R&D subsidies. The majority of the Commission voted for the tax credit solution. The chairman of the Commission, prof. Arild Hervik, together with two other members of the Commission voted for the subsidy solution.
- In addition to the introduction of this new measure, the Commission recommended a 500 million NOK increase in funding of strategic and marked oriented R&D programs administrated by RCN. However, the Commission proclaimed that the content of these programs should be adjusted in order to achieve good synergies with the new measure.
- The funding of risk-taking loans as well as seed-money to start ups, administered by The Norwegian Industrial and Regional Development Fund (SND), should be increased.
- The Commission recommended a series of other measures encompassing the entire national system of innovation, but these recommendations are not so relevant to the theme of this paper.

However, a shift in government soon after to a Labor party government led to the rejection of using the tax system and to an introduction of a subsidy scheme. Soon after the current government took over, representing a political philosophy more in line with the market model, an introduced a tax base scheme, but even more comprehensive than what the Hervik commission had proposed, embracing all firms.

The interesting issue is how the introduction of this innovation policy instrument contrasts with some key arguments on the tax system. Formally, the arguments against a tax credit scheme was that the new measure represents a real expense for the State and, therefore, that it should be treated as an expense in budgetary terms. This argument refers to a subsidy measure administrated exclusively by RCN and not to a tax credit measure.

Furthermore, a subsidy measure could be administered by RCN without the unnecessary and inefficient involvement of tax authorities. Furthermore, it was argued that businesses would appreciate a swift subsidy payment through RCN compared to a tax credit realized after a considerable time interval. Finally, in principle, it is not recommended to impose such tax credits on the tax system because this leads to a non-neutral tax system. A non-neutral tax system, according to economic theory, distorts optimal investment decision making in private sector (see Skatteutvalget 2003: 61).

There are reasons to believe that the real worry of the Ministry of Finance was that firms' statutory right to tax credits may result in a substantial (and in worst case uncontrollable) loss of tax revenues. A subsidy measure, administered by RCN, could, if necessary, be framed in by defining some maximum upper budgetary limits to SkatteFUNN in the annual State budget. In other words, a tax credit scheme would escape the control of the Ministry of Finance. A subsidy scheme was easier to manage and to bring it under the Ministry's budgetary control if necessary.

On the other hand, the SkatteFUNN was seen as the main instrument to achieve the overall goal of reaching a level of R&D investment, measured as share of national GDP, equal to that of OECD average within a five year period. This goal, which had the support of the government parties as well as most parties in parliament, necessitated a rapid and substantial increase of R&D investments especially in the private sector. A tax credit scheme is less likely to be framed in budgetary terms compared to a subsidy scheme. And the unrestrained use of SkatteFUNN by the private sector was considered as a precondition for reaching the OECD average R&D level of investments.

The real shaping of SkatteFUNN took not place in the parties, but in the civil service, especially in negotiations between the relevant ministries. During the second half of the 1990's the Ministry of Education, Research and Church Affairs was struggling hard to get increases in public investments in R&D and in national R&D investments in general. So did the Ministry of Industry and Trade, although they focused exclusively on R&D of relevance to the business sector.

They did not succeed. The Ministry of Finance proposed substantial cuts in the public R&D investments, and the two pro-R&D ministries had to struggle to keep the funding lines they already had allowable. The Ministry of Finance did not accept the arguments presented by the policy advisers in the Ministry of Education and Research, the Ministry of Trade and Industry and other ministries with substantial R&D portfolios seeing R&D and innovation as the driving force of economic growth.

The Ministry of Education and Research proposed the establishment of a special fund for long term research and innovation, the proceeds of which could not be touched by the Ministry of Finance. The Ministry of Trade and Industry was given the task of working for a genuine tax incentive, which – of course – would also be outside the control of the Ministry of Finance. By combining these two measures, the proponents of R&D could hope to gain more funding for public R&D (through the fund) and private R&D investments (through the tax incentive scheme).

It could perfectly well be that the policy advisers and civil servants in the “pro-R&D” ministries originally preferred other solutions, seeing the weaknesses of both approaches. However, given their negative experiences in the annual budget negotiations with the Ministry of Finance, a tax credit scheme would seem to be an alternative strategy to bypass the objections of the Ministry of Finance.

### **5.5. The need for long term perspectives: The case of the fund for research and innovation**

As will also be discussed further below in the context of the state budgets and the ministry of finance in the co-ordination process, there has in recent years been an ever increasing tendency to more “short-termism” in Norwegian policy making. Further, the sector principle was in the late 1990’s seen as a potential source of government failure for policy areas that required a more long term perspective. As the government in the 1999 white paper on research made a commitment to increase the R&D expenditures by 5% yearly, it ensured this by installing a funding mechanism that literally cheated the short term prioritisation logic of state budgets. The solution was the fund for research and innovation, or generally the Research Fund which was set up with a capital base of 3 BNOK, whose earnings should be used to fund research. The capital base has been increased in subsequent budget years. The fund came also to replace a less stable funding for research through a specific public lottery scheme. It is notable that Research Fund was initiated by what many observers held as the first research minister in decades (Mr Lilletun) who saw the need for long term investment, implying that ministers of science and education have been mostly occupied with educational matters. Hence, the case underlines the importance of personal characteristics and ambitions of ministers in question.

The fund is currently (for the year 2003) earning 793 mill NOK from a capital base of 15.8 BNOK. 1/3 of that is devoted to universities and colleges, while the RCN retains the rest (see also below). Although the priorities change according to strategic decisions in RCN, the research part of the fund is crudely allocated to the following priority areas (2002 numbers):

- Quality enhancing initiatives (including Centres of Excellence) with some 175 MNOK;
- Large, long term initiatives or programmes (270 MNOK, like functional genome research, cross sectoral competence areas, long term programmes like petroleum research, material research, biospecter research linguistics and technology, polar climate research, modernisation of the public sector, and basic deceases;
- Thematic priorities in the white paper of 1999 (58 MNOK).

However, there are some dilemmas concerning this new mechanism for increased long term priority of research. Firstly, the prioritization of the fund was meant to channel funding to

research, mainly basic research that was seen as having been under-prioritized. Instead, the fund was increasingly used to finance another reform, the one called the quality reform in universities and colleges. Secondly, and this is not so much a problem as an illustration of the fund being a solution to later defined problems, the fund became the available source of funding for the new Centres of Excellence, as scheme that was initiated in 2002 to enhance scientific quality in selected areas. Thirdly, and this is possibly the most interesting feature, the fund is managed by RCN, and hence reinforcing what some observers call a monolithic structure of research funding in Norway. In other words, as the fund was established, there was no policy in place to ensure a funding diversity in the system, and the fund is generally subsumed under the RCN's priorities. Fourthly, as the earnings from the fund is defined as part of the state budget and thus in the realms of the ministry of Finance, there are some uncertainties as to whether the fund represents a source of fresh money (see Sejerstad 2001).

As a concluding remark, the fund is an interesting illustration of a well meant mechanism for additional or supplementing research funds, but is institutionalised under the umbrella of RCN and thus subsumed under the "monolithic" umbrella of this single research council. Still, the fund helped significantly to improve the long term allocation and prioritization of research funding.

## **5.6. Innovation in fish farming: Different agendas from different ministries**

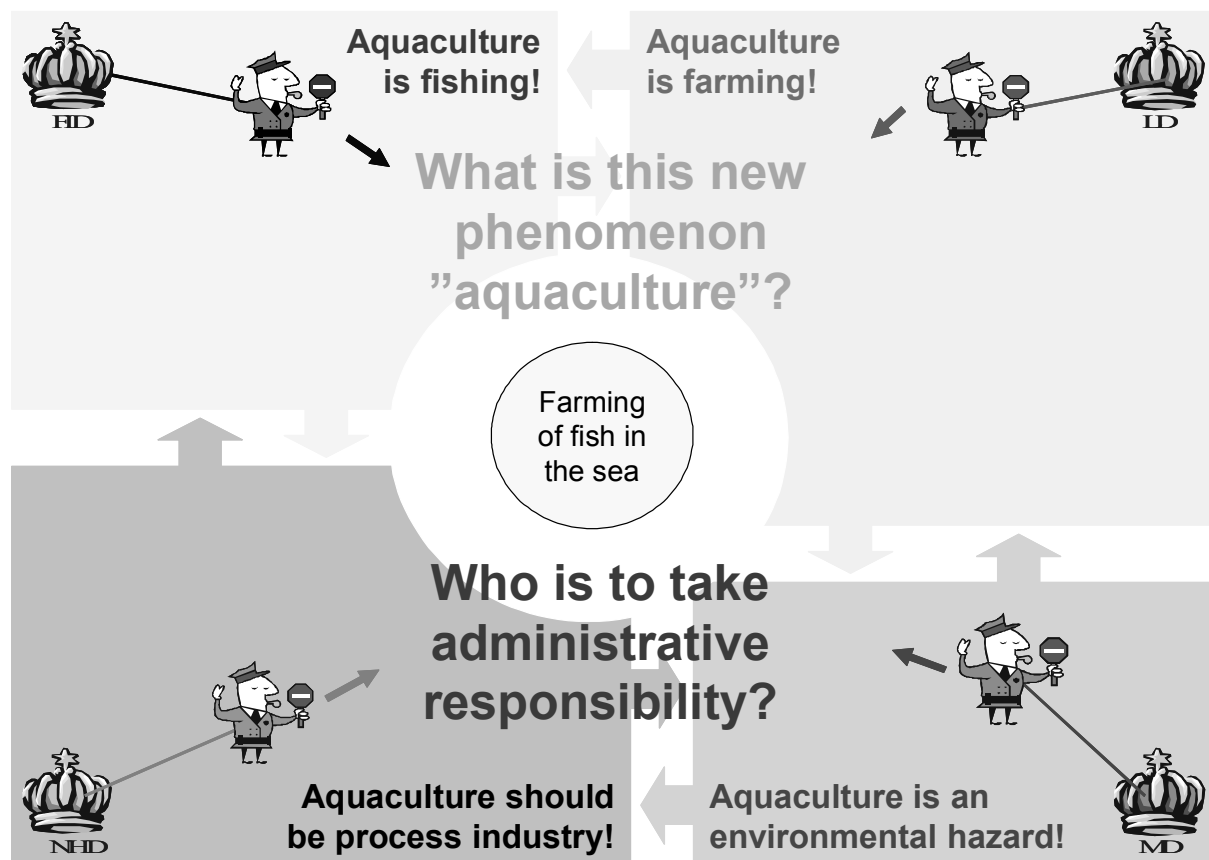
Firms and industries may typically be seen as a nexus of influences from various governmental policies. These may or may not be well co-ordinated. However, it is not necessarily the case that these policies represent instrumental, easy-to-co-ordinate priorities. Rather, they may reflect deeper concerns and traditions in various ministries that lead to a policy environment for a given industry that is both complex and inconsistent.

This is well illustrated in one of the studies in MONIT on how innovation in fish farming is influenced by a set of partly inconsistent and conflicting cultural preferences, priorities and mentalities in policy. Fig 13 shows the interaction on the industry level of four participating ministries in the development of the fish farming sector in Norway (Ørstavik 2004).

This diverse focus is supported by a sector-specific knowledge base typically organised in research institutes and agencies that are linked to the agendas of their principals (ibid). Hence, the conflicting agendas are not only a ministerial challenge of integration, but a structural challenge of providing coherence in the knowledge base used for developing policy for such a sector.

Lastly, the results from this study visualize the difficulties in creating a cross-ministerial strategy for innovation policy, and the problems inherent in perceiving co-ordination as a technical activity when agendas differ the way they do in this case.

**Fig 13: Conflicting agendas for an emerging industry**



## 5.6. Setting a new agenda? The Government's plan for a coherent innovation policy<sup>66</sup>

### 5.6.1. Introduction

Responding to various pressures, the Government set out in 2002 to develop an action plan for innovation policy. This initiative was in particular motivated by two drivers: First the Government had been criticised for a lack of industrial policy and relying only on what many critics termed “old-fashioned”, hands-off market-failure policy with no long term perspective in meeting the structural challenges facing the Norwegian economy in a post-petroleum era. Second, a key political challenge, often referred to as the “shark’s jaws”, was the future discrepancy between the flattening out and even reduction of state revenues from the petroleum activity and the increasing welfare expenditures to be met by the state. This section explores the emergence of this new agenda and to what extent it is linked to subsequent stages of the policy cycle.

<sup>66</sup> This section is based partly on Mariussen, Å. and Fraas, M.: Development of the entire country: Regional and innovation policy co-ordination in Norway. Report on the MONIT regional study, draft, STEP-Centre of Innovation Research, Oslo, 2004.

### 5.6.2. Which agenda?

How was a “holistic” innovation policy to be understood? The SEM declaration of the Government of 2001 explicitly referred to the OECD indicators of national expenditures on R&D. GERD is a measure of public and private investments in research and technological development, as a share of gross national product. Throughout the 1990s, GERD had an important role in countries with an offensive R&D policy, like Sweden, Finland, and Korea. In these countries, *both* public and private spending on R&D is high. High public R&D spending is supporting knowledge development in new industries, where private actors are following research oriented competitive strategies – and accordingly are investing heavily in R&D. The combination of these factors results in a high over-all level of R&D spending. Throughout the 1990s, it also resulted in the development of regional clusters in university and industrial cities, where public spending on universities and basic research was successfully combined with private investments in industrial R&D, exploiting regional labour markets with highly educated young people. This public – private dynamic was often supported by local and regional planning, known as regional cluster policies. It led to growth in capital and medium sized university cities, as well as high GERD levels. In Norway, this industrial dynamic was not initiated. This was the problem referred to by the SEM declaration.

However, a high GERD level is an outcome of a specific form of interaction between public and private partners. The absence of this dynamic in the case of Norway clearly had to do not just with lack of public investments in research, but also in the structure – and strategic orientation - of Norwegian private industries. Most private Norwegian firms – and in particular large firms in the core national clusters, petroleum, maritime and marine industries - are *not* competing to create new science driven products and industries. Instead, innovation strategies are often focussing on a higher level of efficiency in processes based on natural resources. Norway has developed sophisticated supplier industries, for example in machine and engineering industry, as well as highly sophisticated bio-technologies, serving the users in the petroleum industry, shipping, marine aquaculture, and fishing. These industries provide advanced technological products to the receiving industries. An important source of funding is public investments in industry-oriented R&D, through the Research Council of Norway.

The specialization of the Norwegian marine – maritime – petroleum clusters in the direction of *process efficiency* did not motivate these big private actors in the Norwegian industries to invest as heavily and directly in R&D as their counterparts in for example Swedish and Finnish ICT industries did. During the 1990s, this disjunction in the Norwegian innovation system efficiently aborted the initiation of the public – private *synergy* in promoting R&D investments which characterized the leading OECD countries. Instead of a positive spiral of public and private investments, leading to the development of new high tech industries, the Norwegian innovation system is locked into a negative spiral, where lack of private R&D investments is used as an argument to avoid public investments.<sup>67</sup>

One may have thought that the structurally determined lack of firms with entrepreneurial or research driven strategies of competition could be seen as a problem. On the contrary, this somewhat reluctant attitude among the big industrial actors soon became an argument against

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<sup>67</sup> We are not suggesting that copying the Swedish or Finnish pattern would have been wise. For example, the enormous concentration of R&D in a few firms in Sweden is both unfeasible and irrelevant in the Norwegian system, and possibly even ineffective in the Swedish.

the public sector in going in an OECD direction. If private actors are not investing in R&D, why should the public sector do it?

When the problem emerged on the agenda through the SEM declaration, it is not surprising that the initiative to move further was made by the Minister of Research and Education, and the Government's Research Committee. The Minister, Kristin Clemet (Conservative), was a former deputy director of the Confederation of Norwegian Business and Industry (NHO). As the leader of the Research Committee she initiated a cross-ministerial process that continued with the process of a new "holistic" Norwegian innovation policy led by the Ministry of Trade and Industry.

Given the fact that the initiative came from the science and research sector, one may have expected an understanding of innovation inspired from the OECD emphasis on new high technologies, such as ICT, biotechnology, nanotechnology, etc – and a corresponding thrust in the direction of regional clusters in university cities, copying the "OECD success story".

On the contrary, in the debate which followed, it soon became clear that the dominating perception of innovation in the core group of people working on coordination was more in the direction of innovation policy interpreted as a new form of cross-sector *industrial development* policy. It was new *job* creation, rather than new *path* creation – i.e. creation of new science based growth industries - which was the focus.

As it were, the expansion of the *scope* of innovation policy, which was implied in the reference to "holistic" policies, tended to *reduce* the significance of R&D policy. Not surprisingly, then, the responsibility for the development of a new "holistic" innovation policy was transferred to the Ministry of Trade and Industry in the summer of 2002. This move tended to draw attention in the direction of *existing industries* which are the major clients for industrial policy operators. A key focus became the *commercialization* phase of the knowledge conversion process, rather than on science based knowledge creation, and new path creation.

This focus tended to give the work on innovation policy a somewhat incremental point of departure. A Swedish consulting company was asked to make an analysis of the Norwegian innovation system. This analysis did result in some specific recommendations, which were referred to in the plan. However, the over-all point of departure for innovation policy development was not analytic, but administrative. Horizontal innovation policy was interpreted as an upgraded industrial policy – on a cross sector basis. Needless to say, because this placed the administrators in the leading role, the policy making approach taken tended to be incremental.

The minister – level coordinating group had an administrative cross sector secretariat, a HIP committee, the objective of which was to develop an action plan. It was supplemented with thematic groups.

Most of the ministries were involved in this work. The objective was to develop a policy that encompasses more than the "traditional" innovation ministries of Trade and Industry, Education and Research and the Ministry for Local Government and Regional Development. The development of the plan was characterized by horizontal dialogues and hearings between sector ministries, where the development of the understanding and definition of the new



policy was debated. Not surprisingly, this approach stirred up several conflicts of understanding and definition within and between the sectors.

The interaction undertaken in this process was time-consuming, and sometimes frustrating, as there was resistance against the new policy initiative from several partners in the sectors. Sector ministries mobilised arguments against the new policy approach – to defend their objectives and modes of operation. There was also a keen interest in the process from the level of the ministers, who were personally engaged. Accordingly, the process did not produce the needed consensus in terms of developing an analytical basis of the new policy.

These debates led to a document which was published in 2003, titled “From idea to value” (Fra ide til verdi). Failing to achieve a consensus-based, implementable action plan, it was emphasized that the document was a start of a longer process.

### **5.6.3. Loosing coherence: Towards prioritization and implementation**

The document specified that it was an initiation of a process which would continue. The next step came shortly after the publication, and it gave the development a more operational – and somewhat different direction. This was the Government Conference of February 10. Here, the innovation policy of the government was presented. This policy was a step further – to some extent in a new direction, as compared to the previous plan.

The 10 February conference took as a point of departure three major challenges

- Increased international competition, globalization, and technological development
- Reduced production in the core Norwegian industry, petroleum and natural gas,
- Increased costs in maintaining the national welfare and pension system (the shark’s jaw).

The emphasis was a bottom up mobilization:

*“The government recognizes clearly that innovation policy must be bottom-up.*

*Innovation takes place in firms and markets, where people meet. Innovation may also take place in cooperation with other firms and with actors within research and education. But also local authorities are important to enable innovation. Much may be achieved through a right attitude in a municipality. (...) we also have given the county council (fylkeskommune) a new responsibility to enable industrial development.”* (Prime Minister Bondevik, 10 February 2004)

In this way the government strategy was more oriented towards regional policy than the plan presented from the administration. The over all approach was followed up by the Minister of Trade and Industry, Ansgar Gabrielsen, who stated that

*“To ensure our value creation, we must mobilize a common effort in the entire country”*

The Ministry of Trade and Industry launched 8 projects (later to be extended by 2):

- The petroleum and maritime cluster. This project is targeting the core national cluster

- Commercialization of research, with a focus on a leading regional cluster in the “technology capital” of Trondheim
- Northern-Norway – which is a territorially oriented project targeting job creation in peripheral areas
- The industrial cluster Kongsberg-Grenland-Vestfold (a regional cluster)
- The Interior, a territorially oriented project to develop specific industries in agriculture and forestry
- The capital city and regional centers, a project for city and regional development
- Entrepreneurship
- Innovation in services

However, these projects were not based on key priorities in the earlier plan, nor were they a result of a strategic process of prioritization. They were selected through an informal process in which the minister basically made a choice. Hence, there is a weak link between the agenda setting as laid down in the earlier problem identification and plan, and the priorities that came of the process.

This spilled over into the implementation phase: First, the Government chose its own ministries to manage the implementation, giving a marginal role to the implementation agencies like RCN and Innovation Norway. This represents a solution contrary to earlier practice in which ministries do not have any explicit competence in project management. In fact, it runs contrary to the Government’s own principle of public management as one of contracting out tasks that were not seen as key to the Government’s role.

Second, the as key civil servants were not part of the prioritization process, and disagreed with many of the outcomes, they tended to resist the implementation even to the point of communicating negatively about the likely realisation and funding of these projects, to the detriment of both internal confidence in the ministries, as well as external confidence among the business community. It should be noted that the key ministry responsible for the innovation policy, the Ministry of Trade and Industry, is dominated by a strong market failure/market efficiency focus in its traditional economic policy.

Third, the loss of confidence was reinforced as one the implementing agencies, Innovation Norway, received dramatic cuts in its budget in the process of the half-yearly state budget revision in June 2004. The proposal for a cut (later “saved” by the opposition in Parliament), severely undermined the over all confidence in the new innovation policy vision of the Government. This problem came on top of a message of uncertainty in the conference of February 10: The minister of trade and industry communicated that the most important role of the Government in this innovation policy was “to get out of the way” of private industry, hence substantiating a hands-off position vis-à-vis the market.

#### **5.6.4. Inherent contradictions in the policy cycle: A summary analysis**

How can the initiation and early implementation of the Government’s plan for a comprehensive innovation policy be assessed? What may explain the apparent problems that this otherwise timely and important initiative met? We try in this concluding section to bring together some dimensions that, linked to material elsewhere in this report, may put the plan in perspective. It should be added that a specific outcome of this process, the Government’s Committee for Innovation Policy (RIU) will be assessed in chapter 6 as a co-ordination structure.

### **The external threat: Raising the right agenda?**

The perception of the external challenge to Norwegian economy as outlined in the document is mostly long term and related to the widening divide between a long-term decline of petroleum revenues and increased welfare expenditure. The challenge is structural, and the implication would have been to identify a structural solution, like science-based creation of new industries or long term structural change. This is not the case, rather, a shorter term approach of industrial policy and new job-creation became the main focus.

### **Innovation policy v. s. economic policy**

Whereas economic policy in Norway has a focus on general framework conditions promoting entrepreneurship and industrial development, some protagonists of innovation policy argued for the need to make an emphasis on specific, selected industries, like the existing strong clusters – or, alternatively, new high technologies.

This stirred up a debate on “industry neutrality” as a guiding principle in economy policy. The solution to this conflict is balanced in the stated “vision of the government” in the introduction to the document:

*Norway should be one of the most creative countries in the world, where firms and people with courage and creativity have good opportunities to develop profitable activities. In important areas, Norway will be leading internationally when it comes to knowledge, technology, and value creation.*

The orientation towards general or “neutral” industrial policies to promote industrial development and entrepreneurship and job creation across all industrial sectors is obvious through the first sentence. The second sentence balances this approach in the direction of national specialization, without specifying what this specialization is.

### **Innovation policy v. s. R&D policy**

To those who may have expected this document to be in line with the OECD approach of the SEM declaration, it came as a surprise. The document did include an argument for innovation policy, as well as a summary of the debates between and within sectors as to how innovation policy was to be understood and defined. However, to the extent that the document refers to networks of innovative firms, the text is going to great lengths is rejecting the significance of R&D policies.

*Innovative firms are learning firms. It is firms who develop or access the new competence necessary for renewal, either from customers or suppliers, various public or private knowledge institutions, private consultancies, or from public industrial policy agencies. (Fra Ide til Verdi, page 9)*

This statement is a *factual* description of typical incremental innovation processes in core Norwegian industries, in line with findings from innovation research in Norway. Importantly, the document does not make a *problem* out of this state of affairs. This is surprising in the context of the discussion on what innovation is:

*Innovation builds on new knowledge and new combinations of existing knowledge. New knowledge may be generated from practical experiences or through systematic research and development. (Fra Ide til Verdi, page 9)*

When it comes to measures, four priorities are mentioned:

- Educational institutions which produce and disseminate relevant knowledge on an high international level
- Better competence in natural sciences and mathematics
- Strengthen life-long learning and the capacity of firms to apply knowledge in practice
- Increase knowledge flows between industry and milieus of knowledge and competence, regionally, nationally and internationally

The section on “research, development, and commercialization” includes references to

- Work to get Norway to the OECD average in GERD within 2005
- Increased quality and internationalization in Norwegian research
- Stimulate increased research in private industries (through a tax deduction scheme)
- Stimulate commercialization of results of research
- Stimulate better interaction between knowledge institutions and private industrial actors

In sum, the emphasis on knowledge diffusion and application vrs knowledge creation is well balanced:

*An increased emphasis on R&D to promote innovation must be accompanied with increased emphasis on commercialization of research results. (Fra Ide til Verdi, page 27*

The analysis presented on why Norway has such an over-all low level of R&D does emphasize the industrial structure. The answer to this problem is, however, incremental. There is no focus on the need to create new R&D-intensive industries. On the contrary, most of the core measures, such as a tax deduction system for private investments in R&D, and programmes to promote public R&D – private industry networking, are incremental.

### **Regional policy**

The plan document does not have any specific section on regional policy. Instead, regional policy considerations are referred to throughout the entire document. In the introduction, the potential problematic link between a science driven innovation policy and regional policy is presented:

*There are significant regional differences when it comes to the industrial efforts towards development, growth, and innovation. Differences in industrial structure, differences in distances to important markets and knowledge milieus may also generate different preconditions for innovation. An increased transformation from capital- and labour intensive industries towards knowledge intensive industries may also lead to a lower level of activity in the periphery”.*

This obviously is at odds with the over all objective of the government regional policy, which is

*„to secure population, value creation and sustainable local communities all over the country (The SEM declaration, page 37)*

Hence, throughout “Fra Ide til Verdi”, several references are made to various aspects of regional policy, such as:

- The new objective of the Norwegian Research Council, to support R&D all over the country, through regional offices
- The regional development role of educational institutions and regional universities

### **Competing paradigms**

The general emphasis of “Fra Ide til Verdi” is a long-term understanding of the global threat to Norwegian economy. Even though more short-term challenges are mentioned, often referred to in terms which are quite similar to general industrial development policies, it is the long term structural challenge that is identified.

- *No analysis of the national innovation system.* Even though several references are made throughout the document of properties of the Norwegian industry and innovation system, no comprehensive theoretically informed analysis of the National system of innovation is presented. Instead, references are ad hoc – and related to specific problems, such as lacking private investments in R&D, explained through loose references to industrial structure. This incremental approach may be expected, given the theoretical dispute over the field. The field of innovation policy was, and still is, characterized by a conflict between on one hand innovation theorists, on the other hand neo-classical economy theorists. Given this theoretical conflict, assuming an analytical point of departure for policy development was a lost option.
- *An eclectic operational approach.* The other option – which was chosen, was an administrative, eclectic approach. The horizontal or holistic notions of innovation policy are feeding into a general discussion of the framework conditions for Norwegian industry. On this basis, long lists of measures are presented. Several of these measures are quite similar to industrial policy discussions in general.
- *The definition of innovation policy is a contested area.* In the analysis of the document, outcomes of conflicts with other sectors are referred to several times, as compromises of conflicting interests between innovation policy and other policy fields. These outcomes contribute to limiting the scope of innovation policy. They include
  - R&D policy, where the importance of basic research and knowledge dissemination through education and the labour market is emphasized.
  - Regional policy, where the potential conflict between a research driven innovation policy approach – and regional policy spatial redistribution, was emphasized
  - Economic policy, as the document did not contribute to solving the inherent conflict within Norwegian economic policy, between on one hand improving general framework conditions for industry through reducing public spending, on the other hand public investments to break the spiral reducing R&D investments in Norway, preventing new path creation.
- The new innovation policy represents an inherent challenge to the existing policy making paradigm in economic and innovation policy. The general arguments for R&D are well founded, but weakly linked to long term structural choices. To some extent we see two paradigms competing: First, the traditional, strong and well-founded paradigm of market efficiency and market failure, implying a focus on framework conditions and an ideologically based, clear interface between the state

and the market. This implies also a state that “gets out of the way” and interferes in markets only if these are distorted. Second, a more dynamic, long term paradigm based on the presumed need to make choices concerning structural development, a flexible and pragmatic understanding of the interface between the state and the market, and integration between policy areas.

## 6. Co-ordination of policy formulation and implementation

### 6.1. Indicators of horizontalization

Measuring *horizontalisation* in national STI policies is a challenging task. So far there is no established set of indicators for this. The challenge in this part of MONIT is to grasp qualitative aspects of policy in a meaningful system of metrics. There is a growing number of studies on qualitative indicators for policy action. This body of knowledge can be helpful for MONIT. However, one should be aware of the obvious limitations of such indicators.

The Norwegian organization of STI policies is in this respect an interesting case study for several reasons. Firstly, there is a strong and long tradition of a *sector-oriented R&D and innovation funding policy*, meaning that each ministry has a particular responsibility *to fund* research relevant to ministries' objectives. This decentralized pattern of public R&D funding has recently been viewed as a major hindrance for an overall harmonisation of the Norwegian innovation policy efforts (Arnold, 2001).

Secondly, the Research Council of Norway was established in 1993, by merging Norway's existing 5 research councils. The main *coordination* responsibility of national STI-policies is hence delegated to the Research Council of Norway, despite the principle of sector-oriented R&D and innovation funding policy. A distribution of responsibilities on the policy level is attempted re-integrated on the implementation level.

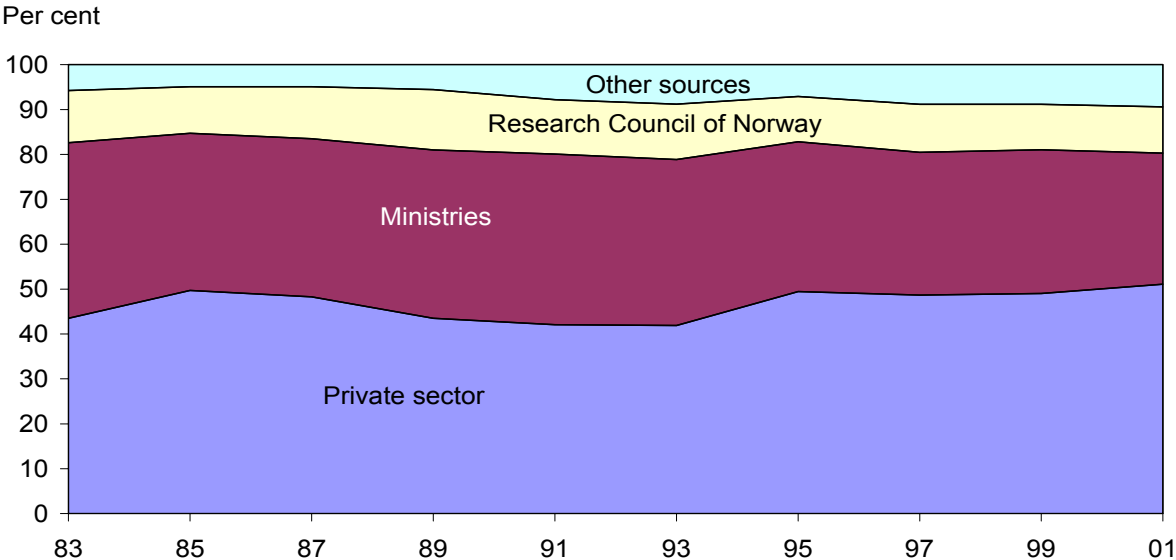
Therefore, there is a tension between ministries' sector-oriented R&D funding policies and a centralized Research Council of Norway which complicates the horizontalisation efforts of national STI- policies in Norway. In the following we shall briefly present some basic indicators and facts about STI-funding policies in Norway.

#### 6.1.1. STI funding in Norway

Figure 14 displays shares of R&D funding in the Norwegian innovation system the last 20 years. In 1990's there is a marginal change towards more private R&D funding relative to public sector. Figure 16 below displays the flows of public R&D funds in 2001.

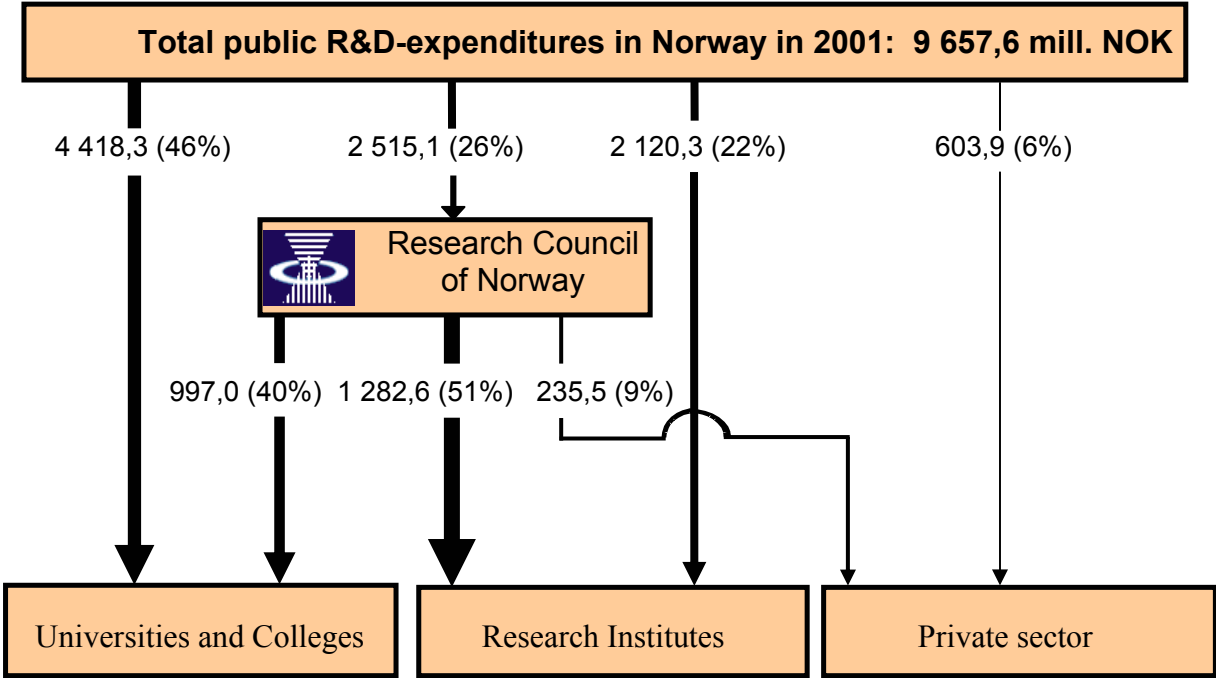
Figure 15 illustrates some of the dilemmas in coordinating ST-policies in Norway. Research Council of Norway (RCN) share of the total public R&D funding was 26 per cent in 2001. R&D direct subsidies to the private sector (as performing sector) are mainly channeled through other sources than RCN, mainly through The Norwegian Industrial and Regional Development Fund (SND). Collaboration between SND and RCN has been quite successful the last years and there are several concrete examples showing an increasing degree of intended complementarity between these two key institutions for innovation policy in Norway.

**Fig 14: R&D expenditure in Norway by source of funding. Shares of total R&D-funding (20,3 billion NOK in 2001).**



Source: NIFU and Statistics Norway

**Fig 16: Public funding to performing sectors. 2001 (2003 data constructed later in 2004).**



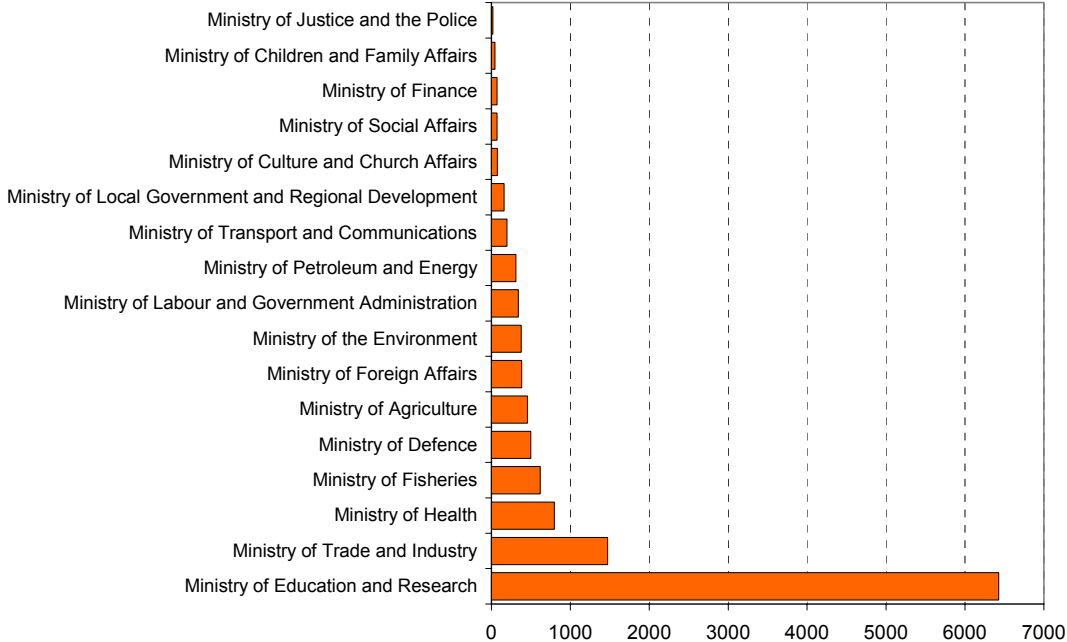
Source: NIFU/SSB (General funds, government's purchase of R&D not included)



Ministries funding of R&D performing institutions takes place either directly with funding allowances or through RCN/SND. Figure 17 shows the breakdown of public R&D funding by ministries.

Figure 16 illustrates the sector-oriented character of public R&D funding in Norway. Of course the most important ministries for ST-policies in Norway are the Ministry of Education and Research and the Ministry of Trade and Industry. However, other ministries, such as, The Ministry of Health, Ministry of Fisheries, etc. are important funding actors of R&D performed by research institutes and the private sector. Several studies of the Norwegian innovation system conclude that a better coordination between Ministry of Education and Research and the Ministry of Trade and Industry could be achieved.

**Figure 16: Norwegian public R&D-funding by ministries.2003. Project assignments excluded. Million NOK.**



Source: NIFU

For a better understanding of the potential for an horizontal and coordinated ST-policy in Norway is important to know not only *who* are the main funding agencies, but also what kind of funds are channeled through the state budget. Table 2 below shows some of the main types of R&D funding in Norway in addition to ordinary R&D transfers via the state budget.

**Table 2: Types of public funding of innovation in Norway**

Ministries' funding of R&D and innovation
Funding of the Norwegian participation in international R&D organizations and in EU's research
Research Fund (Forskningsfondet)
Tax deductions of R&D costs (SkatteFUNN)
Public procurement of technological products and services

*Norwegian participation in EU's Framework programmes* is seen as the main instrument for a more international oriented R&D activities in Norway and have had a remarkable direct and indirect effects on how modern innovation policy is performed in Norway. Not only R&D performers have been more exposed to international R&D collaboration, but also ministries and RCN has been exposed to international policy processes. From this point of view the Norwegian participation to EU's research at a policy level have had a catalytic effect on the advancement of a more coordinated Norwegian ST-policies.

Apart from the ordinary governmental R&D funding there is another important ST funding source in the Norwegian policy system. That is the *Norwegian Research Fund* of about 350 million NOK in 2002. This type of funding is mostly earmarked for high-quality basic research, but it also provides funding to alleviate various 'bottlenecks' in the Norwegian innovation system (see Forskningsrådet 2003). This type of funding is of great interest in the future since it could be used as an instrument to achieve a better coordination within and between national ST-policies. Yet, it is too early to assess the long-run effects of the Norwegian Research Fund on the Norwegian innovation performance.

*Tax deductions for R&D expenditures* is also a new policy measure in Norway, launched in October 2002, and has been welcomed by many firms, most of them having a low R&D performance. A high-profile evaluation of the effects of this new policy measure is already under planning. A particular important issue in this evaluation is the direct and indirect effects of tax R&D deductions on the overall coordination of ST-policies.

Last but not least is the question of how *public procurement policies* are managed and coordinated in Norway. To our knowledge there is a poor if any kind of coordination between state agencies and ministries with respect to procurements of high importance for the Norwegian innovation system. This is a key question, since the value public procurement in Norway amounts to 200 billion NOK per year. Although this figure includes all types of public procurements, it is almost certain that the value of procurements of innovation intensive products and services is much larger than the value of the total R&D public funding.

### **6.1.2. Measuring coordination in innovation policy agendas**

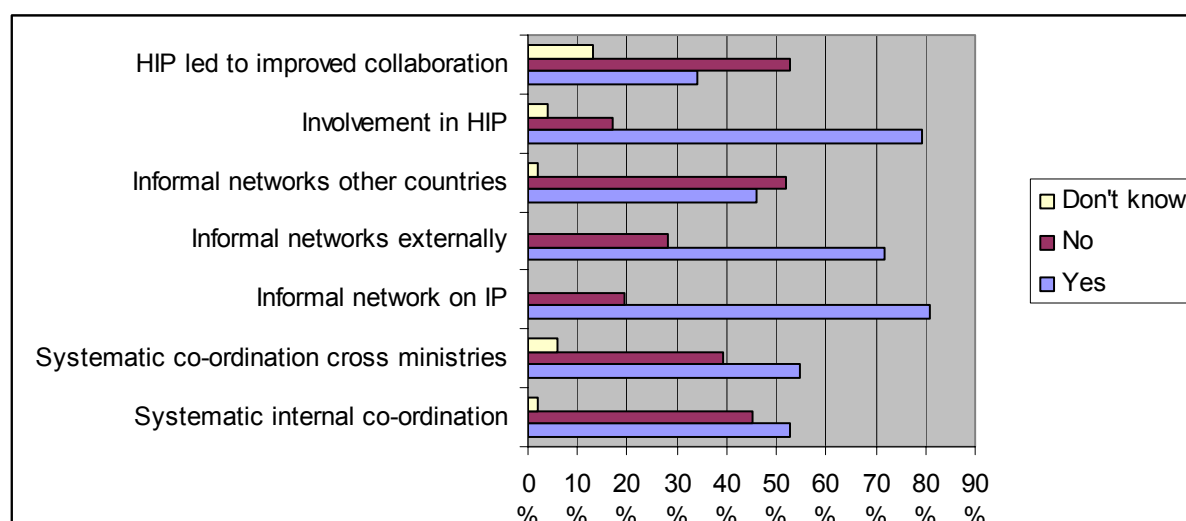
Some few qualitative indicators may be introduced in order to address this question. These are:

- *Importance and frequency of innovation white papers:* There is no regular production of an innovation white paper, although innovation policy issues are included in white papers on R&D, industrial policy etc.
- The Norwegian white paper on R&D policy is signed by the minister of education and research and is published every 4-6 years. The last white paper has been published in 1998 (Stortingsmeld. Nr. 39, 1998-99).
- *A mechanism for regularly producing a government innovation policy agenda or innovation strategy.* The Ministry of Education and Research is responsible for the overall R&D policies, for funding large parts of basic science in the universities and colleges, and for coordinating sectoral R&D policies. In this respect and at the governmental level there are two high level committees both chaired by the Ministry of Education and Research focusing on science and technology policy related issues: the inter-ministerial Research Forum for Government Officials (departementenes forskningsutvalg – DFU) and the Government’s Research Board (Regjeringens forskningsutvalg – RFU). DFU consists of high level civil servants in ministries with a substantial R&D-budget and its main responsibility is to discuss issues of organization of research and innovation policies, including R&D-budget. RFU consist of ministers in ministries with a substantial R&D-budget and its main responsibility is to prepare policy proposals for the cabinet.
- *The number of ministries mentioning innovation in their mission statement:* In Norway only the Ministry of Trade and Industry explicitly mentions innovation as its major objective. However, and as mentioned earlier, almost all ministries have and take seriously their responsibility for funding research (and innovation) falling within their cognitive domain (see for example Fiskeridepartementet 1998, Landbruksdepartementet 2001, Miljøverndepartementet 2001). From this point of view one may say that in the Norwegian governmental system there is relative high awareness but, perhaps, little focus on ST policies.
- *Number of STI-programmes are governed by more than one ministry?* RCN identifies and implement a large number of multidisciplinary R&D-programmes. All these programmes are almost invariably discussed, negotiated, approved and funded by one or more ministries. Therefore, in important innovation areas, such as, biotechnology, ICT, nanotechnology, etc. there are many R&D-programmes funded jointly by many ministries. This again underlines the importance of a RCN as a coordinating actor of STI-policies in Norway, but highlights also the high degree of coordination costs for funding type of innovation not clearly defined within ministries jurisdiction.

### **6.1.3. Co-ordination practices**

Before discussing the practical arrangements in place in the Norwegian system, some indications on the practices and behaviour of the governance system will be illustrated. From the questionnaire we are able to tap into participants’ experiences and assessments, and the results are given in fig. 17.

**Fig 17: Co-ordination practices in innovation policy**



A striking feature is that while the majority of the respondents were involved in the development of the Government's plan for a comprehensive innovation policy (HIP), only some 35% assess that the HIP work led to improved collaboration with other departments or ministries. The existence of informal networks both within own organisation and beyond pervasive, but participation in systemic co-ordination processes within own organisation or across ministerial boundaries is quite mixed.

## 6.2. Two levels of R&D policy co-ordination: The role of RFU and GFU

R&D policy constitutes a core element in innovation policy. It is essentially cross-ministerial and is long term, and therefore subject to specific governance or co-ordination needs. In this context, two arrangements stand out as key to the co-ordination process. They are the Government' research committee (RFU) and the ministries' research committee (DFU), and should be seen as a response to co-ordination needs arising from the following tasks:

- a) White papers on research policy. Research policy is cross-ministerial, as illustrated earlier in the way each ministry, according the principle of sector responsibility, has the responsibility for research policy for its own sector, presuming that they know better than anyone else about long term knowledge needs in the sector. The white papers on research are typically produced every four years (the current situation is 5), and includes the need to exchange information, conduct discussions and dialogue, organising view points from people and organisations inside and outside government and the like. The work on white papers in the Norwegian system is relatively open, typically with inputs from stakeholders and experts, and could be seen as a functional alternative to research foresight processes which has not been conducted in Norway to any great extent for policy formulation purposes.
- b) Yearly state budgets (see further discussion below): This work contains co-ordination activities especially in case of growing budgets, as the additional budget from one year to the next needs to be prioritized and distributed across ministries. In this case the Ministry of Science and Education has a role in proposing to the Ministry of Finance

how a possible distribution should look like. In the case of no-growth or reduction, the co-ordination is essentially done by the Ministry of Finance in their budget balance activity, and the Ministry of Science and Education is not able or competent or intervene in other ministries budgets.

- c) The relationship to the RCN: As RCN is funded by a whole range of ministries, and the interaction between the council and the ministries needs to be co-ordinated.

### **6.2.1. RFU (the Government's research committee)**

This committee is at the outset key to an over all political co-ordination of research policy. However, and this is a contradiction between objective needs and political priorities, it is not institutionalised as such. Every government makes its own decision about the RFU, and one government (the Jagland government in the mid-1990s) even chose to close it down, having other solutions in mind that did not materialize). Hence, the mandate is general, and reinvented for every government. It contains the general task of preparing research policy issues for discussion in Government. The composition varies, relative to the importance given to R&D by each government, to personal interests of ministers etc. But the key ministries are always member of the committee. An interesting point is the current coalition government's decision to only allow less than 50 % of the ministries participate, to avoid a (party-based) decision making process ahead of the formal process in government as a collegium. The meetings are held according to need, typically 3-7 meetings a year. The Ministry of Science and Education is the secretariat and co-ordinates and prepares the agenda etc. It also co-ordinates inputs from other ministries.

It is also variable to what extent civil servants take part in these discussions. From a "back up" point of view, one should expect that this was a regular routine. However, for policy co-ordination to take place without representatives from the individual ministries performing a strict sector based view, the ministers often take part alone. It should be noted that this political, or supra-ministerial, function is similar to the way the committees of deputy ministers perform (see below). The RFU processes and performance vary, mostly with the degree of importance attached to the policy issues at hand.

### **6.2.2. DFU (the ministries' research committee)**

The DFU covers all ministries. It is no decision making body, and it is being led from the Ministry of Science and Education. In earlier times, under a different state budget regime, there was close contact between the two levels of co-ordination. However, with the current framework budgeting (see below), these two have been mostly decoupled.

DFU meets 4-6 times a year, participants in are typically middle management, often 1-2 from each ministry, and DFU is used as a reference group during the work on white papers on research. DFU is an important body for the Ministry of Science and Education as it helps fulfil the co-ordination function assigned to the ministry. In the structural context of the Norwegian public administration, DFU co-ordinates through exchange of information between ministries, facilitating dialogue between them,

In the context of DFU, there is an additional structure of ministries, in particular the two camps of "industrial ministries" like trade and industry, agriculture and fisheries, and "welfare ministries" like social affairs and health. These two camps resembles quite different outlook on R&D policy, they have very different traditions and cultures, making positions in the DFU

quire different. The Ministry of Science and Education has a better contact with the industry ministries, as the latter seem to have a more profound R&D policy as a means to achieve political goals. There is no policy integration at hand between the two camps, e.g. to let industrial R&D be better integrated in areas of health to enhance health technology and the relevant industrial development. Rather, such group structures to some extent compete to have their priorities and line of thinking embedded in the white papers. For example, the recent white paper on research had a tilt towards industrial issues while welfare issues were to a lesser extent on the agenda. Additionally, bilateral processes between ministries take place, as e.g. is currently the case between the ministries of Agriculture and of Fishery in their attempt to align their research policies.

An additional feature of the work of DFU is its working group. To allow for better continuity and to be better able to deal with key policy matters, DFU has also constituted a smaller working group of some eight ministries. They meet more frequently than DFU itself, and focuses especially on policy issues arising from the interaction with RCN, e.g. priorities like large programmes.

### **6.3. Committees of (deputy) ministers**

On major cross-sectoral policy issues, the government organise politically to leverage the co-ordination of the issues at stake. One response may be to organise the work within specific committees of ministries, like spontaneous RFU's. This became the response to the deep co-ordination needs arising from the attempts to formulate a horizontal or coherent innovation policy in 2003 (HIP). As will be discussed elsewhere, this policy came out rather empty-handed and constituted a will to act rather than substantive policy. Committees of ministers are generally difficult to assess, as they are dependent on ambitions, dedication, frequency of meetings and the nature of policy issues. Such committees are backed up by deputy ministries as a working group. For example, the HIP initiative was a new area in which the ministers participating had little experience, and it represented policy initiatives in which some major ministries felt uncomfortable, e.g. ministry of trade and industry. On well known policy issues, such committees may prove more fruitful.

The more relevant co-ordination mechanism that is often put in place, are committees of deputy ministers (CDM). The Norwegian system of government is based on one minister for each ministry (which is frequently changing in numbers and structure due to reshuffling, with the inherent result of fragmentation), and 2-3 deputy ministers, each responsible for dedicated policy areas. The CDM is typically initiated on the basis of a governmental decision which formalises the selection of ministries to participate, and the mandate and leadership. CDM has a key ministry as the "owner" and which also serves as the secretariat. The CDM meets frequently, often once a week, implying a tight working schedule. Based on lessons learned, the following seem to constitute a reasonable assessment of conditions for a positive impact if CDMs:

- In case of difficult political questions (in particular in the context of a coalition government), there is a need to clarify these in government itself, and lay these clarifications down in the mandate, with the result that deputy ministers may more easily arrive at consensus.
- A dedicated leader with legitimacy vis a vis the others in the group.
- Ministerial ownership in the sense that ministries internalise the policy area as one of their own.

- The deputy ministries need to behave as politicians and not as representatives or defenders of sectoral interests of their own ministry. This means also that civil servants participating in the process need to be held in check.
- Active participation is needed, and participation based on duty rather than ambition is detriment to the outcome.
- Well known policy areas are better suited to this co-ordination mechanism, while new ones, like the HIP, needs more time for maturation and more substantial inputs to have an impact, as they may to a greater extent challenge the traditional policy priorities and values of the ministries in question.

#### **6.4. State budgets and the role of the Ministry of Finance**

The budgeting process and the Finance Ministry has been alluded to above, but are important components in innovation policy co-ordination and deserve a more extensive treatment. This is even more so the case as the budgeting procedures changed recently and contrary to expectations gave more elbowroom to the Ministry of Finance and less to sectoral ministries.

Given the lack of long term budgeting, the yearly process for the state budget becomes a key ingredient in the innovation policy co-ordination. The process itself is best depicted by the R&D budgets, and according to the so-called sectoral principle in Norwegian governance, each ministry is responsible for the R&D for its own domain. The process itself overseen, if not steered, by the Ministry of Finance, which takes the role of keeping the budget balance decided by government.

The co-ordination of R&D and innovation allocations were more easy in the former system than the current. Formerly, the process started with the development of an adjusted budget based on last year's allocation adjusted by additional calculations. In addition, the various ministries presented new proposals, and the budgets were discussed in detail also in government. Although this was a rather messy process, this was not the case for the R&D budgets (Olsen 1997):

- Typically, an R&D pool emerged, that is a total allotment for R&D
- The proposals from the ministries were then assessed against the pool
- The Ministry of Science and Education proposed a solution for distribution across ministries, thereby taking on a role as a mini-Ministry of Finance. This was then discussed and decided in co-ordinating bodies like DFU and RFU (see below).

Hence, there was a system in place that ensured a reasonably coherent treatment of R&D budgets. This was helped by a decision in 1989 of 5% growth in R&D as well as a certain profile on these investments. R&D was given priority, contrary to what has been the case in subsequent years.

More recently, a new system emerged, still in place, called framework budgeting. This system is organised through three governmental budget conferences: The first (called Halvorsbøle conference and takes place in March) includes the main priorities for next years budget based on proposals from ministries. As a preparation for this conference, the Ministry of Finance issues so-called R-papers, basically a list of budget cuts to retain a given budget balance. The interesting feature here is that contrary to what one may expect, the Ministry of Finance does not cut on the overall sum (in a framework mode) but directly on detailed posts in sectoral ministries' budgets. Hence, the Ministry of Finance is deeply involved in substantial policy.

The key player in this conference is therefore the Ministry of Finance. The outcome of the conference is a set of preliminary budgets and some proposals that are held against a “profile pool” of new initiatives.

Then there is the adjustment conference in May/June. The ministries have by then allocated the budget posts and often also proposed new ones. The Ministry of Finance is also here the key player. Cuts are suggested often with reference to the budget balance. The third conference is set in August, where the profile pool is distributed.

For our purpose the main conclusion from this process is that ministries responsible for R&D and innovation policy areas have their influence reduced to the benefit of the Ministry of Finance. As R&D lost on the priority lists during the 1990s, R&D is now one of many areas each minister has to defend, compared to earlier where the overall pool received more strategic attention, including recommendations from RFU.

An interesting feature of the recent developments in the budgeting process, is the erosion of long term perspectives, most notably the disappearance of the tradition long term programme issued by the ministry. For decades there was a system in place with the function to ensure long term planning in state budgeting. The ministry had at times even its own secretariat to perform this function. However, the viability of this system, or rather the steady tendency of having a marginal impact of the long term planning, led to the abandonment of the four year planning schedule. It is evident that this development also leads to greater degrees of freedom for the Ministry of Finance, as it assumes the strategic role for each yearly budget.<sup>68</sup> It is also notable that the government as a collegium is weak vis a vis the Ministry of Finance. The government may at points in time communicate visions and strategies, e.g. on targets for R&D investments like reaching the OECD average. But the Ministry of Finance has a very high barrier in the way room is made available for such change in priorities. A new target by the government is not sufficient, and is even not seen as binding, if it is not backed by a formal government decision that explicitly implies that there will be sacrifices in other areas. This was in fact the case in the white paper on research from 1999 (no 39) in which the investment target was extensively discussed. Rather than choosing the fluctuating target of a share of GDP on the level of OECD average, which had been a loose target for a while, the government formulated a binding decision to raise the R&D expenditures by 5% every year over the period covered by the white paper (4 years). This was largely followed up, and the logic of this is that the more expenditures are committed in this way, the less elbow room there is for the ministry of finance in the processes for the yearly state budget.

## **6.5. Building agencies: Processes and outcomes in the case of the Research Council of Norway**

### **6.5.1. Introduction**

The Norwegian state is fragmented, contains more than a fair share of contradictions, and a part of this picture is the “agencification” of the governance system. The case of the Research

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<sup>68</sup> An interesting inconsistency in this case is that the ministry demands from the municipalities a four-year budget plan, and while the revenues of these to a great extent come from the government, the latter’s budget are decided on a one year basis, albeit long term allocations typically in the welfare sector.



Council of Norway (RCN) illustrates very well the complex political processes behind such a reform in the innovation policy governance domain, and is therefore discussed here.<sup>69</sup>

The phenomenon of research councils; separating funding from research, first came into being immediately after the Second World War. The Norwegian Research Council for Scientific and Industrial research (NTNF), under the Ministry of Trade and Industry (NHD), and the Norwegian Research Council for Agriculture (NLVF), under the Ministry of Agriculture (LD) was established in 1946. In 1949 a council for basic research was set up: the Norwegian Research Council for Science and the Humanities (NAVF). NAVF was organized in four sub-councils: medical, natural science, social science and humanities.

The council system was lively debated in the post-war period; the tasks and roles of the existing institutions, proposals to create new research councils and the co-ordination and co-operation between the different councils. New sub-councils were established and reorganized. The universities were not content with their position under NAVF; they wanted to become more active in determining their own research policy. And, a series of committees on governmental level were put in place to advice on research policy.

In 1970 a proposal was put forward to establish a single research council, but was turned down due to its “centralist” character. However, a need for a reform in the research council structure was repeated several times during the 1980s. The need for ‘strategic agencies’ was emphasized, including a capacity of mediating between the political and the institutional level. The relationship was handled through the ‘Langslet doctrine’ in the early 1980s, bringing in the principle of distance between ministries and research. The ministries roles were to define research budgets and not buy research needed to support policy development directly.

In 1990 the Grøholt committee was set up to examine the research council structure. They reported in 1991 that there should be a single research council, organised in three strategic disciplinary councils; for life sciences, physical sciences and technology and culture and social science. The members of these Disciplinary Boards and the Executive Board should be appointed by the government, and the Ministry of education were to take over responsibility for the core funding from the other ministries. The sector principle would in that way be modified, and make room for a national research strategy. There should be a better integration of basic and applied research and a professionalized research management. Research councils should be central, neutral managers of interests, and research policy advice and implementation should be more clearly separated in a re-establishment of the research policy council (*Forskningspolitisk råd*).

There was agreement on the general lines of the Grøholt report, but conflict on the divisional organisation. In February 1992 the major research ministries had reached a compromise upon the new research council; constituting in the six sub divisions (*områdestyrer*) that became the 1993-organisational model:

- The Bio-production and Processing Division (BF)
- The Culture and Society Division (KS)
- The Environment and Development Division (MU)

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<sup>69</sup> See also Remøe, S. and Røste, R. Agency level governance – the case of the Research Council of Norway. Report to the MONIT project, Oslo, STEP 2004, and reports from the evaluation of RCN by Technopolis ([www.technopolis.com](http://www.technopolis.com)).

- The Industry and Energy Division (IE)
- The Medicine and Health Division (MH)
- The Science and Technology Division (NT)

The government had some other proposals than the Grøholt committee regarding the institutional model. A white paper in June 1992 said that the Government should appoint the Executive Board, but that the Executive Board itself should appoint divisional boards. The Government was also of the opinion that the research policy council was not necessary, this should be a part of the tasks of the new research council. The White Paper emphasised in particular the unified nature of the council with the unified organisation of the council's administration. RCN was formally established on the 1st of January 1993.

### **6.5.2. RCN comes into being**

To understand the reasons and dynamics of RCN and its birth, there is a need to go back to the formative year of 1988. At that time there was general agreement that the system of 5 research councils and additional policy bodies like the National Committee for Environmental research, the Committee for Development Research and eight steering committees for priority areas, was in great need of a major overhaul. The system was plagued by many overlaps, rivalries and unclear division of labour (Olsen 2000).

Further, the political climate was ready for change. There was a readiness in the system to generate better conditions for innovation, and it was seen as "... important to make borders between sectors and subjects permeable for knowledge and experiences in other sectors and fields. A more integrated research council system was therefore more than wanted (ibid).

The white paper addressing these issues ended up with a proposal to let an independent commission dig deeper. However, there was no easily traceable link between the proposal by the committee and what came out of the process as the end result. In fact, it is unclear what the committee actually proposed. This is evident from the following statement from one of the committee members:

“The basic idea in the proposal by the committee was that there should be three research councils. To be better able to distribute resources between the three councils, based on a certain degree of scientific competence, and to ensure awareness of areas falling between them, there was at the last moment proposed an umbrella organisation. The result, however, was one council, far more integrated than what the Grøholt committee had proposed. Whether this was caused by misreading of the committee proposal or simply that the political bodies had a very different view than the committee, I do not know.”<sup>70</sup>

More insight into this process is gained from the text in box 2, which links the proposal and the government decision with the Standing committee in Parliament. This committee felt uncertainty as to the proper policy to be chosen, and as a result became victim to this uncertainty, partly due to its own traditional lack of insight in research policy matters.

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<sup>70</sup> Interview with prof. Francis Sejersted, member of the Grøholt committee, *Forskningspolitikk* 2/2001, *Forskningsfondet: Nytenkning må til*.

### **Box 2: RCN in the political process<sup>71</sup>**

A White Paper was submitted to Parliament in May 1992. Initially, the Standing Committee on Education, Research and Church Affairs in Parliament did not see the Government proposal as an obvious road to follow. It was hesitant about discussing the White Paper at the end of a hectic spring term immediately prior to the summer recess. Actually, the Government had presented the White Paper after the normal deadline for such matters in the spring session and postponing it was not far-fetched.

The Standing Committee made a preliminary decision to postpone the matter to the autumn term. They also had in mind to study the R&D organisation in the other Nordic countries before reaching a decision. The possibility of delay led to great disappointment as much activity among the supporters of the reform inside and outside of government. They argued that the research councils should not be in limbo much longer. More importantly, they feared that the opposition to the merger might gain momentum. However, some key actors outside the Parliament managed to make the Chairman change his mind on the timing.

Most of the Committee members soon came to the conclusion that for them it was a matter of “taking or leaving” the entire reorganisation package. It was so much of a fragile compromise that it could easily fall apart if even minor changes were introduced.

The result was that the bill passed the Standing Committee without any major cleavages or changes; the entire Committee except its Progressive Party members (right wing liberalists) supported the Government proposal. However, the Committee stated that all resources to the new council should be channelled through the Ministry of Education and Research. This was a significant, but somewhat naïve point of view, given the existing financial structure, practice and ministerial attachments to the existing funding and existing research councils. For example, the Ministry of Industry channelled the greater part of its funds for R&D through NTNF; Parliament’s view would have revolutionised R&D funding in Norway. The Committee also stated that all staff members in the former councils should be offered jobs in the new council. Accordingly, the new organisation started off without much new blood.

Another point made by Skoie should be added. The White Paper was drafted carefully, almost strategically, and gave room for different interpretations on important points. The text was vague, and critical considerations were left out. It was basically a compromise paper representing a commonality of the positions taken by the research councils and the relevant ministries and “attuned to parliamentary politics”. Further, states Skoie, “... its supporters accepted the merger at a very abstract and general level; during the process many of the qualifications they set for accepting it *de facto* evaporated – they could not at all be met.” (ibid).

A stunning fact is also that while such a reform needs “lubricants” to get off to a good start, typically with sufficient funding, the availability of financial resources declined severely over the next years, challenging both the outside legitimacy as well as the internal functioning of the council (see more below).

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<sup>71</sup> From Hans Skoie: *Diversity and Identity: The Merger of Five Research Councils in Norway*. Science and Public Policy Vol. 27, no. 2 pp 83-96, April 2000.

### **6.5.3. The policy function: Introducing a contradictory role?**

The research council set up from 1993 had, as mentioned, several contradictions that were mainly structural. A salient feature of RCN and the new all-encompassing model was a combination of a classic, albeit highly integrated, research council, whose main function was to implement policy through funding operations, with a policy function. In fact, the RCN was expected by the minister of Science and Education to perform a key science policy advisory role.

RCN never played the role foreseen. In addition to arguing for increased budgets for R&D and providing strategic plans for its own mission (impossible), activities that should be expected anyway (Skoie 2000), no major initiative for long term policy development and prioritization was taken. Meetings were held between the council and the Standing Committee of Science and education. “However, these meetings do not seem to have been particularly successful, and the number of attending ministries has varied considerably. It is noteworthy that criticism of the lack of vigorous advice and engagement from the Council has come from the Government itself” (ibid: 91).

A wider assessment of this seems needed. First, it seems natural that a new council like RCN, meeting with demanding and multiple expectations from the environment, puts the finger on the scar left over from the start up phase: A significant reduction in funding that on the one hand led to infighting for resources and on the other hand to recurrent demands vis a vis its owners for appropriate funding. The lack of funding in the years after this reform is clearly a policy or government failure leading to years of set-backs of the overall innovation system. Second, the inability of the council in performing its policy advisory role may be linked to a vacuum of interest and capability in the political system. The Standing Committee of Science and Education in the Parliament was essentially an educational committee, and members had little if any competence and interest in science or research policy. Still, they were the committee to deal with the R&D budget, while R&D policy and budgets were not dealt with in the committee that had the long term interest in the area from an innovation policy point of view, namely the Standing Committee of Trade and Industry (following an arrangement by the presidency of Parliament, see also ch. 5). It is therefore fair to conclude that the capability failure in the RCN to perform was and is mirrored by the lack of capability, competence and interest in the political system as well as a structural failure of attention in that system.

This criticism of the RCN may also seem unfair. After all, there was an independent research policy advisory committee before 1993, but was abandoned with the research council reform. The RCN was then expected to pick up that function, and has held it until the new reorganisation valid from 2004. While the research policy function may be criticized in general, it played a constructive role in the inputs for policy processes related to white papers and decisions on membership etc in the EU framework programme. Still, the RCN has now more competition in policy advise, as the ministry of Science and Education currently seeks advice and inputs from other institutions like the NHO (employers’ institution, NGO’s, universities etc).

#### **6.5.4. Lock in and representation**

RCN is a typical example of an ongoing trend in reforming governance in Norway: the tendency to build monolithic structures<sup>72</sup>. Such structures may or may not offer co-ordination effects. One point to highlight, however, is the lack of diversity in the system, and the possibility that innovators become too dependent on one source of funding. This is especially the case as Norway has a traditional corporatist structure with representation by interest groups on various levels in committees and boards. As we have seen, the committee structure of RCN invites representatives from user groups, usually established firms, to serve on these committees, and these in turn both formulate objectives and contents of the R&D programmes and decide on distribution of support.

The political economy of this situation is evident, and is further supported by a recent study by Narula (2002). While referring to the representative committee system already described, he illustrates that established firms (larger, energy- and or capital intensive firms) are able to control the priorities of industrial R&D in the RCN, thereby confirming the tendency to exclude smaller, technology-intensive firms which then have to seek R&D funds and collaboration abroad.

The governance problem of producing legitimate allocation decisions when persons serving on the committees are themselves parties with interests in the outcome of the decisions is evident. Hence, on a repeating basis, the problem of independence is haunting the governance of RCN. While there is a need to create distance, legitimacy and independence, there is also a need to ensure sufficient expertise in the areas in question. Further, the system of programme committees is well in line with the kind of corporatist traditions in Norway. While there may be possible to initiate several changes of a detailed nature in the recruitment and proceedings of the committees, the main challenge of such a system in a small country is to operate with sufficient transparency and exploit the potential for using expertise from abroad.

#### **6.5.5. Mission impossible?**

The framework conditions under which RCN has operated mean that many of the more radical ambitions for the reform are simply “mission impossible” (Arnold et. al. 2001: 118 and 39):

“Given the birthday present of a large budget cut, followed by several years of apparent government indifference, the organisations locked itself into internal battles and budget struggles.”

“RCN was set up in a period of very active educational reform. (...) In 1993, with the students’ unions demanding better grants and the overall government budget under pressure, the government reallocated money from research to fund students grants, reducing the budget of the new council. (...) the government therefore unknowingly created conditions which would make it very difficult for the vision of an integrated research council to be realised. This birthday present of a 10 % budget cut set divisions and ministries against each other in a struggle for resources, reinforcing the very obstacles to a more co-ordinated research policy that RCN had been created to overcome.”

The public rhetoric was that of New Public Management, and that RCN had enthusiastically embraced many of these ideas including the principle of management by objectives. However, at the same time, the Ministries’ interests in research are strongly sectorized, and they have a

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<sup>72</sup> A recent one is also the merger of three innovation related agencies: The Norwegian Trade Council, The State’s Fund for Industrial and Regional Development (SND) and the Norwegian Council for Tourism into one new “Innovation Norway”.

tendency to defend their sectoral interests through very detailed micro-management of their research expenditures. Neither the promised money nor the required autonomy was granted to RCN. The effectiveness of horizontal co-ordination advisory mechanisms and the level of government interest in research and innovation policy have been highly dependent upon personalities.

The relationship between the two councils should enable strong cooperation on closely selected topics and this will require a mutual understanding of both the research and the innovation support traditions. With two well-organized bodies this could be easier to achieve, the authors argue, as with the current unified but fragmented RCN seems to be “governed by peace treaties and not by a common strategy.”

The Ministry of Education and Research commissioned the evaluation and was therefore responsible for following up this work. A Project Governing Board (*Styringsgruppe*) was led by Christian Hambro. The Government announced on the 28<sup>th</sup> of May 2002 that the RCN would not be split into two or more organisations.

In an article in the Norwegian newspaper *Aftenposten*<sup>73</sup> the Minister of Education and Research, Kristin Clemet, underlines the need for a close relationship between basic and applied science, which is much easily achieved in one organisation. Moreover, she argues that in many areas the present organisation functions well. There is for instance a better co-ordination of international research co-operation, and a more coherent research institute policy. She mentions several issues that will have to be improved, however. Basic science will have to be strengthened, the innovation policy functions are to be strengthened and better co-ordinated, and internal governance and co-ordination must be improved.<sup>74</sup>

On the 10<sup>th</sup> of September 2002 the Government announced that the RCN would be reorganized. Six divisions were to be replaced by three:

- The Division of Science, which is to contribute to the development of basic science within all disciplines as well as the development of interdisciplinary research
- The Division for Innovation is to be a partner for the private and public sector in the field of research and innovation. The main focus is on innovation.
- The Division for Strategic Priorities is to identify and prepare research needs of national importance and develop the knowledge base in priority areas.

In the October 2002 National Budget, the Ministry of Education and Research gave more detailed presentation of the plans for reorganisation.<sup>75</sup> The Ministry underlined that:

- The main board must be strengthened
- It may be possible for members of the divisional boards to be member of the main board
- The main board will be given the responsibility of reorganizing the institution within the framework given by the Government

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<sup>73</sup> *Aftenposten*, May 29 2002.

<sup>74</sup> Norwegian press release at <http://odin.dep.no/ufd/norsk/aktuelt/presse/045071-070045/index-dok000-b-n-a.html>

<sup>75</sup> St.prp. nr. 1 (2002-2003) Utdannings- og forskningsdepartementet, pp.19  
<http://odin.dep.no/ufd/norsk/publ/stprp/045001-030004/index-hov003-b-n-a.html>

- The Research Council will remain an important policy adviser for the Government. However, the Government will to a larger extent also ask other parties for advice.

On September 1 2003 the Research Council switched to its new structure, in accordance with the reform implemented by the Government.<sup>76</sup>

### **6.5.6. The new model – end of governance failures?**

A key issue emerging from the story of RCN is the fact that the process is one of integration rather than co-ordination. In other words, merging several research councils into one reflects institutional integration, but not necessarily policy-co-ordination. A contrast with the EU framework programme may be helpful in demonstrating this point. Over several programmes the framework system has tried to integrate various activities into more wholistic approaches. For example, the 3<sup>rd</sup> FP concentrated greatly on technology platforms, integration basic and applied research in building knowledge bases for industrial development. The 5<sup>th</sup> FP attempted another focus in using key actions in achieving a more coherent approach to R&D. The current 6<sup>th</sup> FP instigated Integrated Projects (IP) to essentially do the same as the technology platforms attempted in the 3<sup>rd</sup>. Hence, the framework system has been, albeit to variable degrees, an instrument to co-ordinate activities through programme design. RCN on the contrary has been an institutional solution of sectoral integration to what was at the outset labelled co-ordination problems. But RCN as an institution has not been able to co-ordinate various R&D activities through e.g. organising basic and applied research in dedicated programme design.

Therefore, one may rightfully ask the question of how much institutional integration is warranted to ensure proper policy or activity co-ordination? There is no straight forward answer to this, but what maximum integration leads to is a lack of capacity in the system for self-organisation and adjustment, important co-ordination mechanisms that play a role in more loosely coupled, flexible or competitive systems. To high a degree of integration may therefore lead to loss of co-ordination, but of course greater political control. There is therefore a tentative contradiction in this material, as policy makers delegated policy making functions to the research council while at the same time opting for an organisational solution that had greater control potential. In sum, we do not see significant effects in policy co-ordination from these reforms. Some further conclusions may be noted:

First, the case of RCN illuminates a political failure in the sense that the policy system is ill equipped, both in terms of attention and capabilities, to formulate and address long term R&D policy issues. The consequence thereof is two-fold: The political system abdicates from key policy challenges while leaving to the RCN to perform such a role. Next, RCN becomes the level of co-ordination, as the political level is not able to do this. RCN as an example of the agency level in the Norwegian governance system, is then overburdened with co-ordination tasks for which it has few resources. The root of this problem, as we see it, may even lie in the deeply set sectoral system in the Norwegian public administration, a point that is dealt with elsewhere in the MONIT project.

Second, of the two explanatory factors presented for the organisational and co-ordination problems in the RCN, the structural and the cultural, we see the structural as the main problem. The inbuilt tensions in the organisation, reflecting a diverse set of expectations from

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<sup>76</sup> See St.prp.nr. 1 2003 and new governing regulations for the Research Council decided by the Cabinet on December 20<sup>th</sup> 2002.

a complex environment, stretched the council in many directions, giving much leeway to the divisional level. Agency level co-ordination in a world that is highly fragmented is indeed a mission impossible.

Third, the linkage with the outside world, or rather the constituency, through extensive user representation in boards and not least programme committees, may have a great number of advantages. But the history also illustrates that it may extend the conflicting interface with the user community as well as with the science community. This has in particular been the case in several conflicts relating to funding decisions, where people serving on programme committees are part of the decision making process concerning funding of projects by their own competitors. These governance dilemmas have not yet found their solution, but an independent study is being conducted with the aim to recommend new procedures.

Fourth, the policy process leading to and beyond the reform to the current reorganisation was based on assumptions of governance that were ill-conceived. The idea of a monolithic structure being the answer to apparent co-ordination problems seems to be a political preference for control rather than diversity. Researchers and innovators in the Norwegian system may have got a one-door system to forward their applications, but have lost a diversity in which different research and innovation policies may have enriched the funding system and priority setting. We conclude at this point that the underlying logic of achieving coherence is through bureaucratic, agency-level monoliths, rather than flexible and diverse, even competing systems. An interesting implication from this is that a monolithic structure may be by far sub-optimal in achieving policy coherence and –co-ordination in an otherwise fragmented environment, while agency level flexibility and adaptability may be better of, creating the necessary diversity for innovators and researchers to exploit a system in which bounded rationalities are better distributed and represent lower risks.

Fifth, and this is a key issue, there is a need to distinguish between integration and co-ordination. The story of RCN is not a story about co-ordination as such, but rather sectoral integration on an institutional level. Such integration may or may not have co-ordination effects. The process, as well as the outcome, was evidently focussed more on developing a controllable institution than on achieving dedicated co-ordination impacts.

In sum, the story of RCN is one with great and well-meant ambitions, but with many weaknesses. It illustrates that the decision making process is weak, in that far more resources are deployed for ex-post evaluation of the reform than a thorough ex-ante assessment of the status quo as it was. Reforms with vast implications are carried through without a sound policy assessment, and represent often a trend in time and personal political ambitions of ministers and other key actors. We do not know how a revised, multiple system of research councils would have looked like, but a system of more diversity would not necessarily be worse off when it comes to co-ordination and buffering the complex system of interests in the environment.

## **6.6. The Government's Committee for Innovation Policy: A necessary addendum?**

One of the outcomes of the innovation plan issued by the Government in 2003 (according to some observers *the* major outcome) was the establishment of the "Government's Committee for Innovation Policy" (RUI). Given the perceived need to co-ordinate policies across policy



areas, RUI was given a key role, and in the Norwegian system it assumes the strategic body for the Government's strategy in this area.

RUI is conceived basically according to the model of RFU, but as an extended version. While RFU is made up of 5 ministers, RIU has 10 ministers, including those for ministries like health, public administration, finance, and foreign affairs. It is led by the minister for trade and industry. The most striking feature of RIU is that it was organised as a separate institution and did not contain or reorganise RFU. Hence, RIU is a governmental paradox: It has a broader responsibility than RFU, but has no responsibility for the R&D part of the innovation policy. That is still contained in RFU.

As the RIU is just recently established and has no track record of performance, a reliable assessment is not warranted. However, some features of RIU may be highlighted, as it seems to resemble some important characteristics of the innovation plan itself.

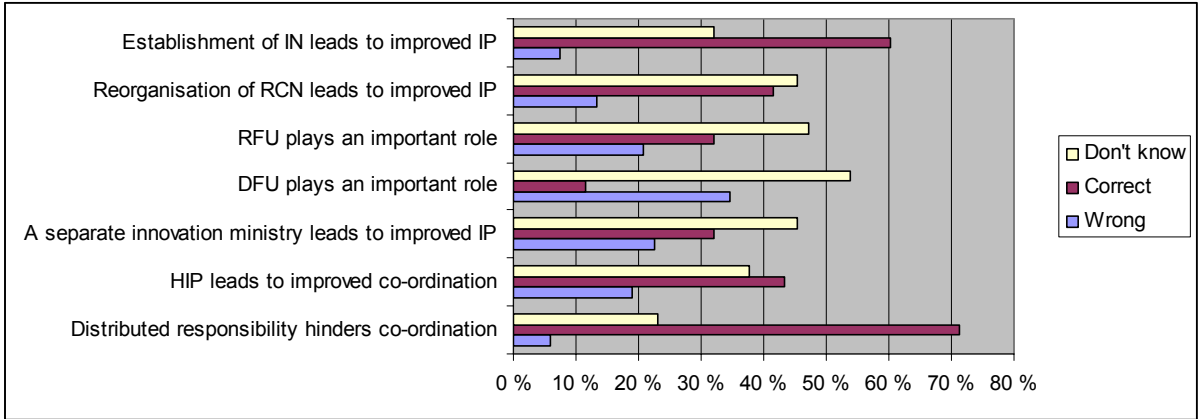
- First, it will meet twice a month (only three meetings at the time of writing). Hence, the intensity of RIU will be higher than RFU.
- Second, RIU has not yet established a strategic agenda, including a broader assessment of the Norwegian innovation system, long term priorities for industrial development or redefinition of the apparent contradictions in Norwegian policy making related to a new innovation policy.
- Third, the key tasks so far has been the management of the 8 (now 10) projects launched spontaneously by the minister of trade and industry in February. RIU itself is focussed on a division of responsibilities for these projects and on avoiding overlaps and inefficiencies in the overall management of them.
- Fourth, as in the case of RFU, the Prime Minister has no function in RIU, and there is therefore no "supra-ministerial" role that could provide perspectives beyond what each minister or ministry brings to the meetings.
- Fifth, to widen the basis for policy making, RIU is being extended with external stakeholders from industry, labour, and science to make up an extension termed FIP (Forum for Innovation Policy). This is an open forum where also the Prime Minister may take part, and is further extended with new participants on a flexible basis. It meets twice a year, and its main function is to ensure a dialogue to improve the contents and direction of the innovation policy. However, FIP is only an advisory body, and there is no obligation for the Government to follow up its advice and recommendations.

As a rather preliminary assessment, RIU is aimed at an incremental co-ordination of the roles of the various ministries taking part in the innovation plan, and may thus serve important co-ordination functions. FIP is a useful extension to provide a dialogue mechanism with stakeholders. However, while RIU includes the ministry of science and education, it is still separated from the committee of R&D policy, which is in our analysis a structural weakness and an unnecessary complexity. Further, the agenda of RIU does not so far compensate for the lack of structural focus in the innovation plan and the need to engage in broad and long term prioritization for structural change.

### 6.7. A summary assessment

In this section we return to the questionnaire for an assessment by those who participate in the system. Fig. 18 taps the respondents' views on some key dimensions of the governance system for innovation policy.

**Fig 18: Assessment of the governance system for innovation policy**



One immediate striking result is that the respondents have great difficulty in assessing the role and impact of the mechanisms in place. For example, both RFU and DFU are met with uncertainty or lack of knowledge, although RFU fares better. An obvious preoccupation is the view that the distribution of responsibilities in the area of innovation policy across several ministries leads to cumbersome co-ordination. On the other hand, there is not much confidence in a specialised or separate ministry for innovation either. There is much hope concerning the merger of agencies into Innovation Norway, but far less so in terms of the co-ordination impact of the reorganisation of RCN.

Taking this into an overall summary, there is apparently too little knowledge of how the key co-ordination mechanisms actually work, and how this leads to policy outcomes. The strong sector principle in the Norwegian governance system is viewed as a serious obstacle to a more coherent and co-ordinated policy although close to 50% assess the HIP process as a useful compensating factor in this respect.

# 7. Policy learning: The production and use of policy relevant knowledge

## 7.1. The policy cycle

Common to all participants in the MONIT project, there is a simple model of the policy cycle. It consists briefly of the following steps:

- a) Agenda setting
- b) Prioritization
- c) Policy implementation
- d) Evaluation practices

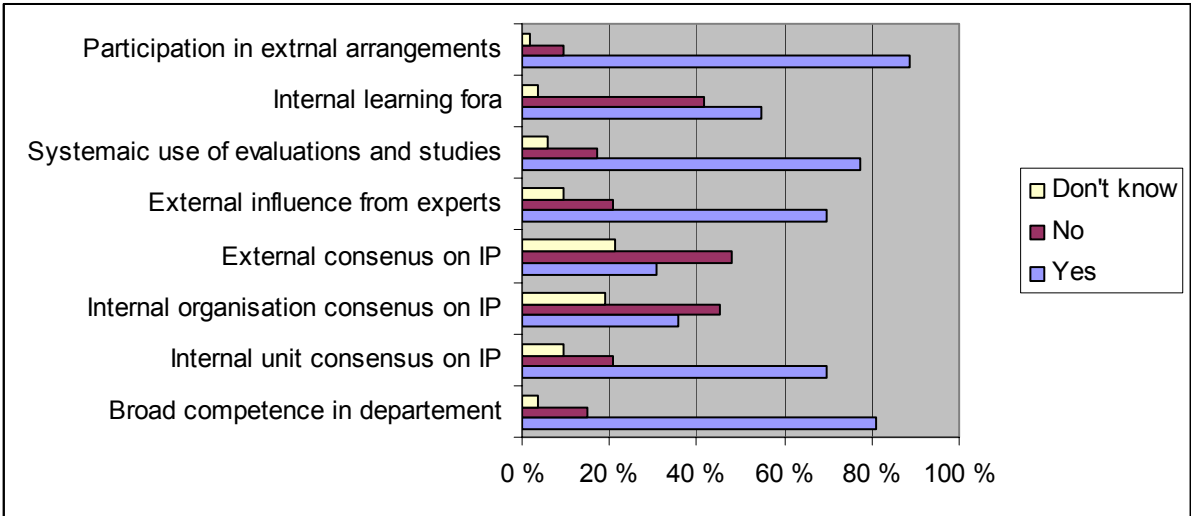
While policy learning has often been associated with evaluation and monitoring practices at the end of this cycle, and their feedback in the cycle for analysis and prioritization, we take the view that policy learning includes the management of learning processes throughout the cycle. Hence, while the cycle itself may be seen as steps to be taken by governments in formulation and implementing policy, policy learning may be seen as the particular ways and means that governments may use in the production, dissemination and use of policy relevant knowledge.

In this chapter we will describe and assess the key policy learning mechanisms in place in the Norwegian system. This discussion will not strictly follow the cycle presented above, but lead to a broader discussion in this context towards the end.

## 7.2. Knowledge and learning the governance system

Before discussing and analyzing the policy learning practices, we present a crude assessment of some policy learning dimensions by respondents of the questionnaire. The results are found in fig. 29.

**Fig 29: Knowledge and learning in the governance system**



The message from this figure is that there is a great activity but little consensus, There is a clear assessment that available competence among colleagues in innovation policy issues is

quite high, and there is a notable participation in external workshops, seminars etc. The use of evaluations and other assessments and studies is very extensive, as is the receptivity of inputs by external experts like researchers. On the other hand, there is a significant lack of common understanding and consensus between organizations like ministries on what innovation policy is and should contain, a fact that necessarily leads to collaboration and co-ordination problems

### **7.3. Strategic intelligence**

The Norwegian system does not use technology foresight as a means for forward looking, strategic intelligence. Even though some socio-political traits seem very conducive to such foresight processes, notably an otherwise corporatist basis for dialogue and partnership, the political system has not embraced the foresight model as a broad, collective process for prioritization and learning. This seems to be rooted in a lack of tradition in such a collective, expert-based process with an imperative that outcomes and recommendations should be included in the government's policy making.

#### **7.3.1. White papers**

However, there are in place mechanisms that partly serve as functional alternatives. Most notably this concerns the white papers and the way these are being produced and used. In short, white papers are broad communications from the government to parliament on some key policy issue. As mentioned earlier, innovation related white papers are being produced regularly in the case of R&D, and less regularly on related issues.

What makes the white paper interesting from a policy learning perspective, is that the process is quite open and based on a number of inputs from a variety of inside and outside sources. The full cycle of producing a white paper takes typically 1-2 years. They contain a factual description on areas under scrutiny, and include broad assessments of developments, challenges and policy options. The government will often use extensive outside expertise, e.g. the RCN, but increasingly also other sources like stakeholders (e.g. the Norwegian Business Association). Experts often participate, indirectly or directly, in providing updates on specific issues, reflections on complex topics, and summaries of relevant research.

The white paper is in the Norwegian system an important document, although they vary in quality, comprehensiveness, and ambition. Hence, some white papers, also in the R&D and innovation policy domain, have a standing as reference documents even parts of the proposals therein may not be followed up for political reasons.

#### **7.3.2. Commissions and hearings**

In line with the committee based corporatist model in place in Norway, the work by commissions (a simple term for short term task forces or committees) is important as well as abundant. On several complex policy issues, like the reform of RCN and the tax credit scheme for R&D, both of which discussed in this report), such commissions are set up with a mandate given by government or a minister, and a participation typically based on a mix of representing stakeholders and independent expertise.

As with the white papers, the work of the commissions are open, only even more so. Their work is typically published in the series of public documents called "Norwegian Public Studies" (NOU). This practice implies full transparency of the process, such that the independent council represented by the commission is public in full.

There are two related policy learning processes attached to these commissions. First, governments will not adopt their council as such, but will often launch a white paper in which the governments own assessment is presented as well as a proposal vis a vis parliament. Second, and before this takes place, the study is publicized to target audiences with invitations to respond with comments and proposals.

It is important to state that the link between these commissions and subsequent white papers or even governmental decisions is rather weak. It means that governments may or may not adopt the line of thinking used in the studies, and may reject partly or fully the recommendations coming out of them. Still, they are important institutions for policy learning, in particular since they are open and inclusive.

## **7.4. Evaluation practices**

If the strategic intelligence function of the system is limited to two, albeit rather well-functioning institutions, the evaluation practice in Norway in the context of innovation policy is very broad and comprehensive. Further, it is worth mentioning that the various evaluations undertaken are also linked to the existence of a relatively large sector of social science research institutes and other research based consultancies. These are indirectly an extremely valuable part of the policy learning system, and Norway's policy learning rests on an active exploitation of the research community, much unlike most other countries.

For practical purposes it seems fair to divide the evaluation practice in two; institutional evaluation and programme evaluation<sup>77</sup>. These are discussed separately below.

### **7.4.1. Institutional evaluation**

There is a comprehensive evaluation practice with the aim to assess and develop innovation related institutions. Crudely speaking, there are several variations according to which institutions are being evaluated. We may divide this practice as follows:

- a) Agency evaluation: This takes place when a responsible ministry intends to consider reform of their own agencies. The evaluation of RCN is a near example, the evaluation of the State fund for regional and industrial development (SND) another. In the first case the evaluation contract was given to foreign expertise, with a Norwegian subcontractor for technical assistance and data collection. Such agency evaluation will only be launched at times of specific change or controversy, and is thus not a regular evaluation practice.
- b) Performer evaluation: The research institutes and other knowledge institutions are regularly evaluated as part of the contractual relationship with the RCN. RCN has within its mandate the responsibility to manage the sector via a system of basic funding and strategic institutional programming, and regular evaluation, typically every 5 years, by a broad, often international panel is carried out. These evaluations are conducted in a learning rather than a control mode, implying that the institute (or university etc) in question is expected to enact on the recommendations set forth in the evaluation, and hence comply with the expectations from RCN. As such, evaluation is carried out within the

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<sup>77</sup> In addition RCN performs discipline evaluation, like evaluation of Norwegian research in engineering science currently underway.

framework of improvement as an imperative in the contractual relationship between the institution and the RCN.

#### **7.4.2. Programme evaluation**

Programme evaluation represents the core business of Norwegian evaluation practice. The centre of this activity is the RCN (and to a lesser extent other agencies running programmes, like SND). This activity is very much an issue of accountability, whereby the funder is expected to generate reliable knowledge about the use of its public funds.

Programme evaluation is conducted on a regular basis, primarily as an ex-post evaluation after a programme has ended. Programmes, be they research programmes or innovation related programmes, typically last 5 years and are managed by a programme committee made up of a mix of stakeholders and professional expertise. This committee manage the programme according to a mandate supplied by the administration of RCN. This mandate is then used as a point of reference for the evaluation.

While the programme committee will not launch a programme evaluation, but rather the administration of RCN itself, this is different with monitoring. Monitoring on the programme level is usually to be decided by and carried out by the programme committee as a means to ensure learning within their management task. Hence, monitoring is not a regular activity.

#### **7.5. Evaluation in RCN**

As the RCN was established in 1993, one of the 10 tasks assigned to it by the statutes laid down by Government was to “Implement and follow up evaluation of research and research institutions”. After the reorganization in 2004 this item still exists, albeit changed to the shorter “ensure evaluation of Norwegian Research”. An evaluation strategy was developed and endorsed by the main board of RCN in 1995. This was ambitious, and stipulated that the resources devoted to evaluation in RCN should be raised from 0.22% (1994) to 1-2% of the total budget, in line with international practice.

The strategy was comprehensive, but not followed up. Currently, there is no overall budget for evaluation in RCN, and over the years the responsibility for conducting evaluation has been delegated to the divisions and their need for evaluations of programmes and research institutions. This does not mean that evaluation is neglected. On the contrary, it is pervasive, and as seen above, widely used. The apparent problem is that the strategy endorsed in 1995 was never followed up as a RCN-wide mode for learning and development. In particular, this concerns the need for a comprehensive, strategic evaluation of the overall goal fulfillment of RCN and its role performance. This was among the issues stated in the strategy, but not implemented. Neither was there a follow up on the strategic need to create a central R&D evaluation budget for evaluation across divisions. Rather, the yearly evaluation plan resembles a bottom up assembly of evaluation projects by the various divisions. In sum, and which was confirmed by the RCN evaluation, the strategic approach to evaluation is missing, a point that has weakened the strategic role RCN could have had, and which would have helped RCN fulfill another statutory task: Giving advice to government on R&D policy.

However, a number of activities and improvements have been initiated over the years, some of which are briefly discussed below as examples of a practice that seems to be the brand mark of RCN: Operative evaluation of programmes and institutions:

- As RCN has the responsibility of governing the framework conditions for the research institute sector through basic funding, it has developed a set of criteria for performance of research institutions that are evaluated every 5-6 years. These institutional evaluations are basically development oriented rather than towards control.
- A forum for evaluation of strategies and instruments for industrial development (EVA forum) has been in place since 1994. This forum aims at contributing to learning and improvement of the knowledge base for evaluations and their practical use. Several ministries participate together with RCN, the Norwegian Business Association (NHO), Innovation Norway etc. Recently the ministry of research and education has cut their participation, as has the business association, seemingly an indicator of loss of relevance. However, State Accountancy system has showed interest and participates.
- A modular system of data collection and analysis (ProVis) has been established, improving the database for evaluation of results, effects and impacts in and among firms participating in RCN's programmes.

These examples illustrate that activities are there, but, as the evaluation of RCN by Technopolis confirms, evaluation activities are extremely decentralized, implying too little attention to this function as a strategic learning tool, and evaluation results are hardly used for institution-wide learning and role development.

It should be noted that some notable changes may be under way. With the recent reorganization of RCN, new initiatives have been made to re-establish evaluation as a centralized, strategic tool to enhance knowledge production and use for policy development. With the simpler organizational set-up of RCN, such a strategic function should be within reach.

## **7.6. Two lessons from other policy areas**

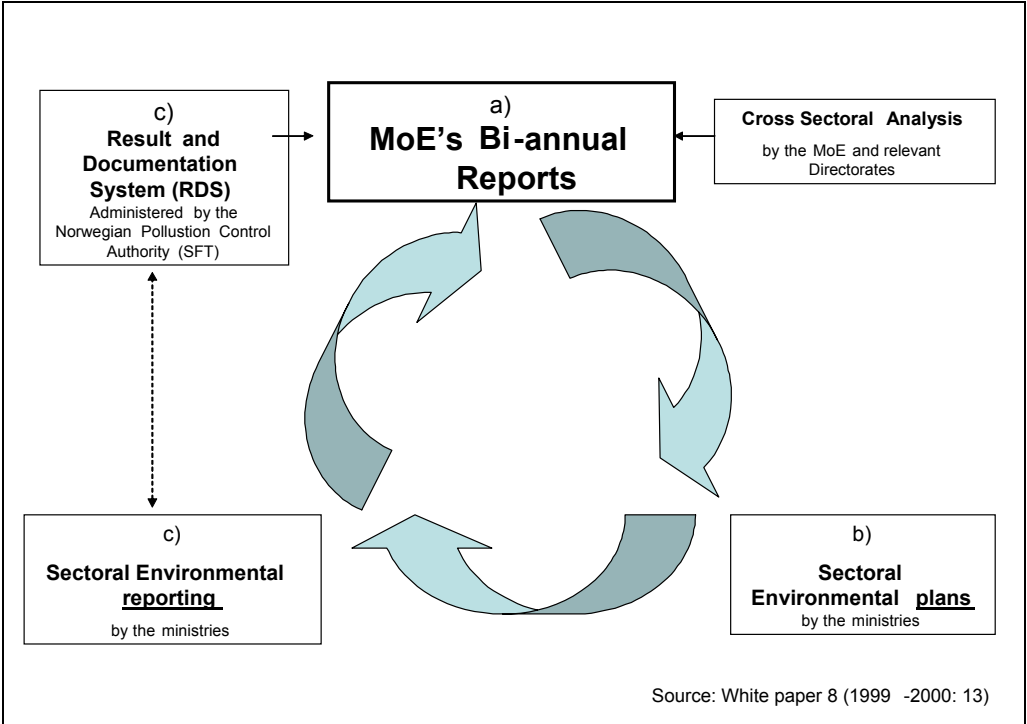
Wrapping this chapter up, we will draw attention to some results from studies of two policy areas within the MONIT project. As mentioned in the outset of this report, three policy areas outside the traditional realm of innovation policy have been studied, with the aim to generate knowledge of governance in complex, horizontal areas that may be of value in developing governance capabilities for comprehensive, horizontal innovation policy.

First, the study of ICT policy in Norway, or the governance of national plans for the information society, a particular mode of governance emerged that deviates from the traditional bureaucratic, hierarchical mode. Although a special unit in the Ministry of Trade and Industry has the central responsibility for co-ordination of the policies and initiatives in this area, the practice of governance is far more decentralized and flexible (Pedersen 2004). Governance rests more on distributed knowledge flows and self organization, leaving units in other ministries or agencies with great responsibility for priority setting and implementation. In line with Grande (2001), the mode of governance can be referred to as emergent policy making, in contrast with deliberate policy making that is more hierarchical and top-down. While the latter may have been useful for stable, non-complex environments, the former seems functional for dynamic, complex environments with a high degree of uncertainty and hence less potential for hierarchical control. On the one hand, this mode of policy making has inherent co-ordination mechanisms built upon flexible adaptation and self organization. On the

other hand it has a need for a more decentralized build up of information and learning systems.

Second, and this is in line with the first point, horizontal implementation of a particular policy area may be well supported by dedicated monitoring and information systems that help integrate information on the effectiveness and progress of policy implementation. This was well illustrated in the study of environmental policy (see Ruud and Mosvold Larsen 2004). To follow of a national action plan for environmental policy, a particular monitoring system has been initiated that has the potential of being a powerful tool for broad based implementation and learning across ministerial sectors, as illustrated in fig. 20.

**Fig 20 The National Environmental and Monitoring System**



The system builds on an overall national strategy broken down in sectoral environmental plans. From these plans each ministry is required to provide reports that are integrated in a result and documentation system (RDS), which together with cross sectoral analysis form the basis of bi-annual reports from the Ministry of Environment. Although this system is not properly implemented, it has potential for elevating environmental policy into a dynamic, horizontal learning area. Innovation policy would be a relevant candidate for such a system.



## 8. Towards a comprehensive innovation policy?

### 8.1. Conclusion

The general conclusion arising out of this analysis is that the Norwegian governance system is rather ill fit for broad, strategic developments in innovation policy. The many contradictions in the policy processes make it extremely difficult to formulate strategic policies for innovation. However, significant changes have been introduced in recent years that are likely to continue. We will highlight the following important factors supporting this conclusion.

- a) Innovation as a key ingredient to economic growth and industrial restructuring has received great attention. Over the past years this area of policy has been elevated to a central place on the political agenda. However, the winner in real terms is R&D. R&D policy has received the significant increases in funding, not least through new mechanisms like the Research Fund and the tax break scheme SkatteFUNN. In the context of tight macro-economic and fiscal management, the “science rationality” and the research community has won back a role as a nexus for governmental efforts at a knowledge-based renewal.
- b) While the government’s plan for innovation policy has been framed in an economic policy setting, it was initiated by the R&D sector. While R&D policy avoids cuts in state budgets, industrially oriented innovation policy is more easily a target for such cuts, illustrating on the one hand a tension between direct measure handles by implementation agencies and indirect measures (SkatteFUNN). As long term budgetary allocations will need a binding governmental decision to guide the ministry finance, we conclude that a broad, industrially oriented innovation policy has not yet received the backing as a governmental strategy, although rhetorically it has.
- c) The past decades have reinforced a market oriented economic policy giving a far less strategic role for the state than was the case in the decades after 1950. In the context of trends like new public management and economic or market oriented liberalism as the general pillars of economic policy, markets are expected to solve long term allocation and strategic decisions. This has served one important function in innovation policy, competition, and competition policy has been revitalised. The state has become a passive capitalist with great ownership in Norwegian industry, but without strategic visions. The role of the state is deemed ideologically to be passive and “not get in the way” of private enterprise as was recently stated by the minister of trade and industry. Projects as vehicles for long term development and resource allocation has been abandoned compared to what was the case in the decades after the war.
- d) The general organisation of the state is now more fragmented than before, with a greater role played by agencies and the implementation phase. The prime minister level is weak, combined with strong and autonomous ministries, making it difficult to transcend yearly combats for resources in the budgeting process. Corporatist stakeholder involvement has been reduced relative to the former model used by social democrats in the build up after the war. The sector principle in R&D policy has a significant strength in that it institutes a broad-based, but distributed responsibility for each ministry to invest in R&D in their respective areas. However, it reinforces autonomy and independence that are assessed as being obstacles for a government wide linkage between innovation and economic policy.
- e) The parliament is organised to balance the labour burden of MPs, and the standing committees are the key units in which the parliament allocates resources. However,

the real co-ordinating and policy making process takes place in the party groups, instructing the committee delegates in how to vote and decide. Hence, one may conclude that the parliament abandons the potentially professional decision making in the standing committees to the benefit of general policy making in the party groups. As key parties are divided on the economic vrs innovation policy discussion, a consensus based redefinition of industrial policy has been difficult.

- f) Without formal strategic decisions for long term resource allocation for R&D and innovation, the short term logic of the state budget implies a powerful role for the Ministry of Finance. The ministry is in a position to ensure detailed intervention into sector ministries priorities during the budgetary process. This may be useful seen from the perspective of managing the state budget from one year to the next, but in the case of policy areas needing a long term perspective, it seems counter-productive.
- g) The reform of the research council system into one singular council with a strategic mandate has not reduced the detailed earmarking practice of ministries funding the council. Hence, as mentioned above, the sector principle prevails. But this effectively reduces the strategic role of the council which is then not able to counteract the lack of strategic decision making in government. The result is that the system overall lack significant strategic capability.

The Norwegian system is relatively well equipped with governance capabilities for static coherence. Extensive, short term co-ordination is being conducted, operative, ex-ante evaluation practices are abundant, and prioritization of long-term investments in the education system for human capital conducive to the nation's need for technology development and competence has been a decade long challenge. Further, and in line with this, innovation policy has not yet been sufficiently framed in a dynamic setting, where such a broadly based domain is seen to play a major role for long term structural change to meet the challenges from a reduction in oil and gas production.

A main problem in the Norwegian system is the ideologically based view on a proper interface between the state and the market. This is also a mix of fiction and reality, as e.g. the current policy principle of industrial neutrality (avoiding selective preferential treatment for individual industries or firms) is both enhanced as the leading foundation of industrial policy, while at the same time is hollowed out through special treatment of sectors with strong corporatist stakeholder involvement like agriculture. Further, the process of globalisation has lead to differential regimes for different industries, implying that governments are pushed to consider competition based adaptation of support regimes, like for ship-building.

## **8.2. Recommendations for Norwegian innovation governance**

Some recommendations emerge from the material as the need to improve the governance system and policy processes is evident.

First, a government level function that helps increase the strategic, long term capability for resource allocation and change of development paths is needed. Often governments look to Finland and her Science and Technology Policy Council for a solution. This is not presenting itself as the proper solution in Norway as it is likely that an extra-governmental body will not function with sufficient legitimacy. Therefore, and given the unbalanced relationship between the prime minister's office and the ministries, it is recommended to strengthen this office with both manpower and formal competence to instruct and request sector ministries on issues of long term strategy development. In particular, there is a need to improve the cross-ministerial

capability for horizontal action, and the best placed body for that function will be the office of the prime minister.

Second, more weight should be given to ex-ante policy analysis and evaluation for important policy developments like the comprehensive innovation plan. This will help generating a common understanding of the challenges ahead prompting new initiatives, improved and joint understanding of what innovation policy is, better bases for dialogue in working groups and task forces crossing ministries and create a better link between the agenda being set, the priorities selected, and the implementation of these priorities.

Third, the ministries' governance of the RCN needs to be changed with less earmarking and more build-up of the council's strategic competence. Further, the current mandate of RCN to perform a R&D advisory policy function vis a vis the government should be reduced and/or replaced by a standing, independent commission to give advise to government on long term R&D and innovation policy issues. This is currently being implemented as an extension to the Government's Committee on Innovation Policy (RIU), but steps should be taken to ensure its legitimacy and that its recommendations are followed up. A precondition for this is that government lends ear to recommendations coming from this body, in particular in terms of redefining industrial policy and the choice of larger, integrated projects used as vehicles for innovation and change.

Fourth, a renewal of the role of the state in policy is warranted. In particular, there is a need to develop pragmatic models of how a "neo-corporatist" state may operate in a globalized economy, without entering into the traps of selective support of input factors like in the 60's and 70's. What is needed is a policy that better exploits the state's potential as an organising vehicle for long term investment, and stimulation of industrial development based on the assumption that different industries generate different externalities and thus different mechanisms for knowledge creation, flows and use.

Fifth, there is a need to develop what may be termed multi-objective policies through both policy co-ordination as well as policy integration. While the former rests on various mechanisms through which alignments of policies may be achieved, the latter implies greater efforts to building multiple goals into broader, integrated policy domains, in particular domains with a great degree of horizontality.

### **8.3. Generic capabilities for innovation governance**

All countries have their own history, specialisation, culture and institutional trajectory and set-up. Hence, lessons and recommendations from and for one country are hardly transferable to others. But the following seems to be generic lessons that may have wider relevance.

- a) Governments should invest in ex ante policy analysis and evaluation providing a platform for dialogue, mutual understanding and strategy across ministries.
- b) A strategic government function should be implemented that transcends tendencies to short-term, distributive co-ordination and ensures a more dynamic, long term resource allocation to areas that have an investment nature.
- c) Monitoring and learning mechanisms should be given attention to sustain emergent, de-centralised and adaptive policy making.

- d) Explicit identification and formulation of sector policies' objectives and instruments to help integrate policy across ministerial sector and reduce overlap, inconsistencies and complexity.

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<sup>1</sup> St.prp. nr. 1 (2002-2003) Utdannings- og forskningsdepartementet, pp.19

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<sup>1</sup> See St.prp.nr. 1 2003 and new governing regulations for the Research Council decided by the Cabinet on December 20<sup>th</sup> 2002.



## **Annex 1: Interviewed persons**

Marit Halleraker, secretary for the Standing Committee of Trade and Industrial Policy

Svein Erik Høst, Research Council of Norway

Carl Huitfeldt, Ministry of Trade and Industry

Morten A. Meyer, former deputy minister, Ministry of Regional and Municipal Affairs

Tore Olsen, former deputy executive officer, department of research policy, Ministry of Science and Education

Trine Paus, Research Council of Norway

Hans Skoie, former director of NIFU, National Institute for Studies of Education and Research

Grete Sønsteby, Ministry of Trade and Industry

Kari Balche Øyseth, Ministry of Science and Education

# Annex 2: Questionnaire

## 1. Bakgrunnsinformasjon

Spørsmålene er fordelt på 4 seksjoner. Det vil ta ca 4 minutter å besvare undersøkelsen. Du kan navigere fram og tilbake i skjemaet ved hjelp av knappene nederst på sidene.

### 1.1 Kjønn:

Mann  < value="1" name="q0101" >

Kvinne  < value="2" name="q0101" >

### 1.2 HØYESTE oppnådde utdanning:

Tilsvarende videregående skole eller lavere  < value="4" name="q0102" >

Høgskole- eller universitetsutdanning, lavere grad (opp til 4 år)  < value="1" name="q0102" >

Høgskole- eller universitetsutdanning, høyere grad (mer enn 4 år)  < value="2" name="q0102" >

Doktorgrad  < value="3" name="q0102" >

### 1.3 Arbeidssted:

Departement  < value="1" name="q0103" >

Annet  < value="2" name="q0103" >

Antall år du har arbeidet i departementet eller forvaltningsorganet du nå er ansatt i:

<1  < value="1" name="q0104" >  
1-5  < value="2" name="q0104" >  
5-10  < value="3" name="q0104" >  
>10  < value="4" name="q0104" >

Antall år du har arbeidet i avdelingen du nå er ansatt i:

<1  < value="1" name="q0105" >  
1-5  < value="2" name="q0105" >  
5-10  < value="3" name="q0105" >  
>10  < value="4" name="q0105" >

Antall år du har arbeidet med innovasjonspolitiske problemstillinger i organisasjonen du nå er ansatt i:

0  < value="1" name="q0106" >  
<1  < value="2" name="q0106" >  
1-5  < value="3" name="q0106" >  
5-10  < value="4" name="q0106" >  
>10  < value="5" name="q0106" >

Antall år du har arbeidet med innovasjonspolitiske problemstillinger i andre organisasjoner enn der du nå er ansatt:

<1  < value="1" name="q0107" >  
<1  < value="2" name="q0107" >  
1-5  < value="3" name="q0107" >  
5-10  < value="4" name="q0107" >  
>10  < value="5" name="q0107" >

(Med *avdeling* menes den laveste enheten du hører inn under i organisasjonen, for eksempel seksjon i et departement)

## 2. utfordringer i innovasjonspolitikken

I denne delen av spørreskjemaet ønsker vi å få et bilde av hva du anser for å være de sentrale utfordringene i norsk innovasjonspolitikk. Med innovasjonspolitikk forstår vi i denne sammenheng politikk som skal bidra til kunnskapsutvikling og nyskaping i og for næringslivet. Slike prosesser finner ikke sted i isolasjon, men innenfor større systemer - såkalte innovasjonssystemer - der en rekke faktorer spiller inn: for eksempel lover og forskrifter, offentlige virkemidler, utdannings- og forskningsinstitusjoner, bedrifter, finansmarkeder, internasjonal konkurranse, etterspørsel i markedet osv. Under har vi listet opp flere mulige problemområder innenfor et lands innovasjonspolitikk. **For hvert alternativ, ber vi deg vurdere viktigheten av dette problemområdet som et fremtidig satsningsområde for innovasjonspolitikken i Norge.** Viktigheten vurderer du ut fra en skala fra 1 til 4, hvor 1 står for ikke viktig; 2 for lite viktig; 3 for ganske viktig; og 4 for svært viktig.

### 2.1 Bedriftssystemet

a) Bedrifters tilgang til såkornkapital og annen finansiering

1  < value="1" > 2  < value="2" > 3  < value="3" > 4  < value="4" >

- name="q0201a" > name="q0201a" > name="q0201a" > name="q0201a" >
- b) Styrking av FoU-virksomhet i bedriftene  < value="1" name="q0201b" >  < value="2" name="q0201b" >  < value="3" name="q0201b" >  < value="4" name="q0201b" >
- c) Kompetanseutvikling i bedriftene i form av kurs, opplæring, videre- og etterutdanning, rådgivning, etc.  < value="1" name="q0201c" >  < value="2" name="q0201c" >  < value="3" name="q0201c" >  < value="4" name="q0201c" >
- d) Andre viktige satsningsområder innenfor bedriftssystemet:

name=q0201dtx row s="3" col >

## 2.2 Utdannings- og forskningssystemet

- a) Andelen av befolkningen med høyere utdanning (på universitets- eller høgsolenivå)  1 < value="1" name="q0202a" >  2 < value="2" name="q0202a" >  3 < value="3" name="q0202a" >  4 < value="4" name="q0202a" >
- b) Styrking av grunnforskningen/universitetsforskningen  < value="1" name="q0202b" >  < value="2" name="q0202b" >  < value="3" name="q0202b" >  < value="4" name="q0202b" >
- c) Styrking av forskningen innenfor instituttsektoren  < value="1" name="q0202c" >  < value="2" name="q0202c" >  < value="3" name="q0202c" >  < value="4" name="q0202c" >
- d) Kommersialisering av forskningsresultater fra universitets- og høgsolenektoren  < value="1" name="q0202d" >  < value="2" name="q0202d" >  < value="3" name="q0202d" >  < value="4" name="q0202d" >
- e) Tilbudet av etter- og videreutdanning  < value="1" name="q0202e" >  < value="2" name="q0202e" >  < value="3" name="q0202e" >  < value="4" name="q0202e" >
- f) Andre viktige satsningsområder innenfor utdannings- og forskningssystemet:

name=q0202ftxt row s="3" cols >

## 2. Utfordringer i innovasjonspolitikken (forts)

Under har vi listet opp flere mulige problemområder innenfor et lands innovasjonspolitikk. **For hvert alternativ, ber vi deg vurdere viktigheten av dette problemområdet som et fremtidig satsningsområde for innovasjonspolitikken i Norge.** Viktigheten vurderer du ut fra en skala fra 1 til 4, hvor 1 står for ikke viktig; 2 for lite viktig; 3 for ganske viktig; og 4 for svært viktig.





### 2.3 Det politiske systemet

- a) Utvikling av kunnskapsgrunnlaget for innovasjonspolitikken (herunder forsknings- og utredningsprosjekter)  1 < value="1" name="q0203a" >  2 < value="2" name="q0203a" >  3 < value="3" name="q0203a" >  4 < value="4" name="q0203a" >
- b) Systematisk evaluering og referansetesting av innovasjonspolitiske virkemidler, organisasjoner og satsninger  < value="1" name="q0203b" >  < value="2" name="q0203b" >  < value="3" name="q0203b" >  < value="4" name="q0203b" >
- c) Læring og kompetanseutvikling i organisasjoner og avdelinger med direkte eller indirekte ansvar for innovasjonspolitikken  < value="1" name="q0203c" >  < value="2" name="q0203c" >  < value="3" name="q0203c" >  < value="4" name="q0203c" >
- d) Samarbeid og koordinering mellom organisasjoner og avdelinger med direkte eller indirekte ansvar for innovasjonspolitikken  < value="1" name="q0203d" >  < value="2" name="q0203d" >  < value="3" name="q0203d" >  < value="4" name="q0203d" >
- e) Andre viktige satsningsområder innenfor det politiske systemet:





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## 2.4 Nettverksbygging





a) Etablering av bedriftsnettverk (nasjonalt/regionalt)

1	2	3	4
 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204a"	name="q0204a"	name="q0204a"	name="q0204a"





b) Etablering av nettverk mellom bedrifter, utdannings- og forskningsinstitusjoner og innovasjonspolitiske aktører

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204b"	name="q0204b"	name="q0204b"	name="q0204b"





c) Etablering av nettverk mellom norske og utenlandske bedrifter

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204c"	name="q0204c"	name="q0204c"	name="q0204c"





d) Etablering av nettverk mellom norske og utenlandske forskningsmiljøer

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204d"	name="q0204d"	name="q0204d"	name="q0204d"

e) Etablering av nettverk mellom norske og utenlandske innovasjonspolitiske aktører

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204e"	name="q0204e"	name="q0204e"	name="q0204e"

f) Etablering av nettverk mellom norske og utenlandske forskningsmiljøer





 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0204f"	name="q0204f"	name="q0204f"	name="q0204f"

g) Andre viktige satsningsområder når det gjelder nettverksbygging:





name=q0204gtxt row s="3" col

## 2.5 Generelle rammebetingelser for næringslivet





a) Forenkling av offentlige lover, regler og administrative rutiner

1	2	3	4
 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205a"	name="q0205a"	name="q0205a"	name="q0205a"





b) Skatte- og avgiftspolitikken

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205b"	name="q0205b"	name="q0205b"	name="q0205b"





c) Den offentlige innkjøpspolitikken

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205c"	name="q0205c"	name="q0205c"	name="q0205c"





d) Utbredelse og bruk av informasjons- og kommunikasjonsteknologi

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205d"	name="q0205d"	name="q0205d"	name="q0205d"

e) Standardiseringsarbeid

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205e"	name="q0205e"	name="q0205e"	name="q0205e"

f) Lovverk for patenter og immaterielle rettigheter

 <	 <	 <	 <
value="1"	value="2"	value="3"	value="4"
name="q0205f"	name="q0205f"	name="q0205f"	name="q0205f"

g) Lover og regelverk i EU/EØS

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"	value="4"
name="q0205g"	name="q0205g"	name="q0205g"	name="q0205g"

h) Internasjonale avtaler (for eksempel WTO)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"	value="4"
name="q0205h"	name="q0205h"	name="q0205h"	name="q0205h"

i) Andre viktige satsningsområder når det gjelder generelle rammebetingelser for næringslivet:

<input type="radio"/>
name="q0205itxt row s="3" cols="3"

### 3. Læring i det innovasjonspolitiske systemet

STEP ønsker i den tredje og fjerde delen av spørreskjemaet å kartlegge din oppfatning av hvordan læring skjer innenfor det innovasjonspolitiske systemet, og hvordan innovasjonspolitikken blir koordinert på tvers av institusjonelle og organisatoriske skillelinjer. I spørsmålene som følger mener vi med *organisasjon* departement eller forvaltningsorgan. Med *avdeling* menes den laveste enheten (for eksempel seksjon i departement) du hører inn under i organisasjonen. Vi ber deg først besvare følgende spørsmålene ut fra svarkategoriene ja, nei og vet ikke.

#### 3.1 Kunnskap, kompetanse og læringsprosesser i det innovasjonspolitiske systemet

a) Bærer personsammensetningen i avdelingen du jobber i preg av stor faglig bredde?

<b>Ja</b>	<b>Nei</b>	<b>Vet ikke</b>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301a"	name="q0301a"	name="q0301a"

b) Opplever du at det er overensstemmelse i forståelsen av hva som er en god innovasjonspolitikk innad i din avdeling?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301b"	name="q0301b"	name="q0301b"

c) Opplever du at det er overensstemmelse i forståelsen av hva som er en god innovasjonspolitikk mellom din avdeling og andre avdelinger i samme organisasjon?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301c"	name="q0301c"	name="q0301c"

d) Opplever du at det er overensstemmelse i forståelsen av hva som er en god innovasjonspolitikk mellom din organisasjon og andre organisasjoner som arbeider med innovasjonspolitiske problemstillinger?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301d"	name="q0301d"	name="q0301d"

e) Opplever du at forståelsen av innovasjonspolitikk i din avdeling inspireres av eksterne aktører, så som forskningsmiljøer?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301e"	name="q0301e"	name="q0301e"

I så fall, hvilke?

<input type="radio"/>
name="q0301etxt row s="3" cols="3"

f) Gjør din avdeling bevisst bruk av evalueringer, forsknings- og utredningsrapporter, eksempler på "good practices" fra andre land, etc. som kilder til læring innenfor området innovasjonspolitikk?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301f"	name="q0301f"	name="q0301f"

g) Har organisasjonen du jobber i interne fora for læring innenfor området innovasjonspolitikk?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301g"	name="q0301g"	name="q0301g"

h) Har du det siste året deltatt på eksterne seminarer, konferanser, workshops eller lignende innenfor området innovasjonspolitikk?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0301h"	name="q0301h"	name="q0301h"

### 4. Koordinering i det innovasjonspolitiske systemet

#### 4.1 Koordinering av innovasjonspolitikken

a) Deltar avdelingen din systematisk i fora for koordinering av innovasjonspolitik mellom ulike avdelinger innad i organisasjonen?

Hvis ja, hva slags fora er det snakk om?

<b>Ja</b>	<b>Nei</b>	<b>Vet ikke</b>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302a"	name="q0302a"	name="q0302a"
>	>	>

b) Deltar avdelingen din systematisk i fora for koordinering av innovasjonspolitik mellom ulike organisasjoner i forvaltningen?

Hvis ja, hva slags fora er det snakk om?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302b"	name="q0302b"	name="q0302b"
>	>	>

c) Tar du del i uformelle nettverk av personer som jobber med innovasjonspolitiske spørsmål i organisasjonen du er ansatt i?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302c"	name="q0302c"	name="q0302c"
>	>	>

d) Tar du del i uformelle nettverk av personer som jobber med innovasjonspolitiske spørsmål i andre organisasjoner (forvaltningsorganer, forskningsmiljøer, etc.)?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302d"	name="q0302d"	name="q0302d"
>	>	>

e) Tar du del i uformelle nettverk av personer som jobber med innovasjonspolitiske problemstillinger i andre land?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302e"	name="q0302e"	name="q0302e"
>	>	>

f) Har din avdeling vært involvert i arbeidet med regjeringens plan for en helhetlig innovasjonspolitik (HIP'en)?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302f"	name="q0302f"	name="q0302f"
>	>	>

g) Har arbeidet med HIP'en ført til at avdelingen din har styrket eksisterende - eller inngått nytt - samarbeid med andre avdelinger eller organisasjoner?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0302g"	name="q0302g"	name="q0302g"
>	>	>

#### 4.2 Vurdering av det innovasjonspolitiske systemet

Under finner du en rekke påstander om det norske innovasjonspolitiske systemet. Vi ber deg om å vurdere påstandene ut fra følgende svaralternativer: galt, riktig, vet ikke.

a) Organiseringen av innovasjonspolitik i ulike departement fører til at koordineringen av politikken vanskeligjøres.

<b>Galt</b>	<b>Riktig</b>	<b>Vet ikke</b>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0303a"	name="q0303a"	name="q0303a"
>	>	>

b) Arbeidet med regjeringens plan for en helhetlig innovasjonspolitik (HIP'en) vil føre til en bedre koordinering av innovasjonspolitikken.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0303b"	name="q0303b"	name="q0303b"
>	>	>

c) Opprettelse av et eget innovasjonsdepartement ville ført til en bedre innovasjonspolitik.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0303c"	name="q0303c"	name="q0303c"
>	>	>

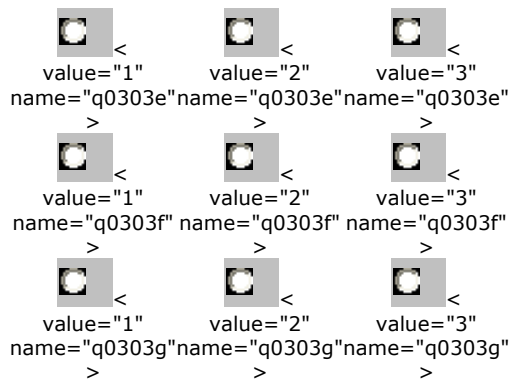
d) Departementenes forskningsutvalg spiller en sentral rolle for den innovasjonspolitikken som blir utført.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
value="1"	value="2"	value="3"
name="q0303d"	name="q0303d"	name="q0303d"
>	>	>

e) Regjeringens forskningsutvalg spiller en sentral rolle for den innovasjonspolitikken som blir utformet.

f) Omorganiseringen av Norges Forskningsråd vil føre til en bedre innovasjonspolitik.

g) Omorganiseringen av Statens Nærings- og distriktsfond (SND), Statens Veiledningskontor for oppfinnere (SVO), Norges Eksportråd og Norges Turistråd vil føre til en bedre innovasjonspolitik.



### Annex 3: Innovation policy measures 2002: Complete list

	Title	Period	Annual budget 2002 (NOK)	Annual budget 2002 (€)	Description	MONIT classification
1	TaxFIND	2002-indefinite	750 mill	91 mill	SkatteFunn is a measure that gives SMEs tax allowances for investments in R&D. 18% (or 20 % in the case of SMEs) of expenses for R&D projects may be deducted. The basis for deduction is R&D expenses of up to NOK 4 mill (approximately € 530 000) for internal projects, and another NOK 4 mill for co-operative projects (or NOK 8 mill for co-operative projects alone). The R&D projects should aim at generating new knowledge, information or experience which is of value to the development of new products, services or production processes.	Company system
2	The seed capital funds	1997-indefinite	720 mill*	87 mill*		Company system
3	User driven programmes	Start date varies – no definite ending	App. 650 mill	App. 78,8 mill	The public ‘user driven’ R&D programmes are based on the premise that enterprises wishing to take part in publicly funded R&D programmes should have a decisive influence on the direction, control, management and implementation of the relevant programmes and projects.	Company system Education/research system
4	Centres of excellence	2001-2011	155 mill	18,8 mill	The instrument Centres of Excellence is to stimulate Norwegian research environments to establish centres dedicated to long-term, basic research at a high international level to raise the quality of Norwegian research.	Education/research system
5	The IFU/OFU	1994-indefinite	112 mill	13,6 mill	The main objective of the IFU programme is to	Company system



	programme				increase the co-operation between SMEs and larger firms. An IFU-contract is an agreement between two companies, aimed at developing a product or a process needed by one of the companies (the customer). One of the two should be an SME. The State will support the endeavour financially. In the OFU-programme the customer is a public institution.	
6	Programme for competence development	2000-2003 (may be continued)	100 mill	12,1 mill	The Ministry of Education and Research has established a programme for competence development that is to contribute to innovation in the market for life long learning. Companies, municipalities, knowledge institutions, labour organisations and others may initiate projects under this programme.	Company system Education/research system
7	Innovation scheme	Includes several schemes with varying start dates – ending not decided	89 mill	10,8 mill		Company system
8	The entrepreneurship grant/the business establishment grant	1989-indefinite	84,2 mill	10,2 mill	The entrepreneurship grant is a scheme for business entrepreneurs in all parts of Norway, but with a particular emphasis on entrepreneurs in cantonal Norway. The main aim of the scheme is to stimulate to increased business establishment, to create durable and profitable jobs for both women and men.	Company system
9	FORNY	1994-2010	59 mill	7,2 mill	The FORNY programme is to support the process for wealth creation by improving the ability to commercialise research-based business concepts or ideas conceived at universities, colleges and research institutes, professionalize the process of commercialisation; turn the commercialisation of research-based business concepts into a strategic area	Company system Education/research system

					of activity and set up a permanent service of commercialisation of research-based business concepts through the establishment of a company that can deal with all aspects of the commercialisation process.	
10	MOBI  Consists of three sub-programmes: • TEFT • ARENA • nHS	2002-2009  TEFT: 1994-2003 ARENA: 2001-2005 nHS: 2002-2004	52,1 mill  TEFT: 20,8 mill ARENA: 2,3 mill nHS: 28,9 mill	6,3 mill  TEFT: 2,5 mill ARENA: 0,3 mill nHS: 3,5 mill	MOBI (Mobilisation for R&D related innovation) is an ‘umbrella’ programme covering several smaller programmes. Its main goal is to promote learning, innovation and value creation in companies with little experience with R&D. In general this means SMEs. In many of these companies there are barriers to innovation, e.g. high risk associated with innovation activities, lack of relevant expertise and of knowledge of how to acquire such expertise, and lack of capital. MOBI’s ambition is to reduce the number and impact of such barriers. The programme also aims at increasing the companies’ R&D based innovation efforts by stimulating long term co-operation with other companies, R&D environments and actors from innovation policy institutions, particularly on a regional basis. MOBI is to continue and develop the activities of the BRO Programme, and covers the following four sub programmes: <i>Industry oriented focus on colleges</i> (nHS, Næringsrettet høskolesatsing) – the objective of which is to establish competence increasing co-operation between companies and public university colleges <i>SME Colleges</i> – which aims at strengthening the position of university colleges in regional innovation <i>TEFT</i> – which aims at promoting the transfer of	Company system Education/research system Political system  TEFT: Company system Education/research system ARENA: Company system Education/research system Political system nHS: Company system Education/research system

					<p>technology from research institutes to SMEs  <i>ARENA - Regional innovation pilots</i> – the goal of which is to contribute to the development of regional innovation systems and industrial clusters  In addition to stimulating the innovation efforts of firms, MOBI’s ambition is to increase industry oriented research within R&amp;D environments and to improve the institutional framework for innovation. The programme will also function as a ‘laboratory’ for the development of innovation policy measures, where existing measures are to be improved and new measures developed and tested.</p>	
11	FRAM	1992-2005 (may be continued)	40 mill	4,9 mill	FRAM supports basic learning within SMEs, particularly in the field of leadership and the building of company strategies, the goal being to make the companies more profitable.	Company system
12	KUNI	2002-2007	35 mill	4,2 mill	<p>KUNI is a research programme which aims at strengthening the theoretical and empirical knowledge base for industrial innovation policies. The programme wishes to contribute to the development of a clearer appreciation of the factors contributing to value creation ; a better decision basis for industrial policies at both national and regional level ; and prominent research environments that can contribute to the international knowledge development in the field.  KUNI focuses on two areas of research: (1) Innovation policy and value creation in an open economy; and (2) The role of knowledge development in innovation. Within the first area, there is need for more knowledge about the factors influencing innovation ; the factors prompting</p>	<p>Education/research system  Political system</p>

					<p>commercial exploitation of innovations ; the areas in which returns on innovation differ significantly between industry and society at large ; the effect of innovation on firm organization ; clusters and cluster formation ; the factors that promote and restrain innovation ; the relative importance of selective and general measures in innovation policy and regional policy ; the relative importance of market power and competition in promoting innovation based industrial development ; and the relationships between ownership and innovation. Important issues within the second area of research are the value creation potential in new forms of knowledge and new combinations of knowledge; the facilitation of systematic knowledge development; and the exploitation of the possibilities offered by ICT. The programme encourages research environments to develop projects within the two areas of research. The programme gives priority to a small number of large projects in order to secure quality through concentration and long term activity. Some small projects will be included, however, to ensure flexibility. The results of the programme are to be communicated continuously through seminars, conferences, the internet, mass media and scientific journals.</p>	
13	BIT	1989- ending not decided	34,1 mill	4,1 mill	The BIT Programme is to improve the profitability and competitive ability of firms by developing common ICT solutions adapted to specific sectors of industry.	Company system
14	Industrial	1999-ending not	30,6 mill	3,7 mill	The objective of the industrial garden programme is to stimulate value creation in the regions by creating regional clusters of	Company system

	gardens	decided			<p>SMEs which offer attractive work opportunities for highly educated persons.</p> <p>An industrial garden is a group of knowledge intensive firms gathered under one roof. The idea is, that by sharing premises the firms constitute a professional and social environment which stimulates co-operation, exchange of knowledge, and mutual skills upgrading. The industrial garden environment is to stimulate the starting up of development activities – either within the single firm or in co-operation between the firms. In addition, the arrangement gives the participating firms the opportunity of establishing a cost saving common technical infrastructure.</p> <p>Each industrial garden is connected to the other industrial gardens - i.a. through a common web-site and seminars - and should also be linked to wider industrial and competence networks.</p> <p>As of today, there are 30 industrial gardens in Norway. Most of them are specialized within the fields of data processing, business services, trade and health and social services.</p>	
15	The NT programme	1987-2004 (may be continued)	24 mill	2,9 mill	The programme gives support to innovation in Northern Norway, by providing capital and advice and by developing networks of companies and knowledge institutions.	Company system Education/research system
16	Value creation 2010	2001-2010	21,3 mill	2,6 mill	The main goal of the Value creation 2010 programme is to promote in-firm and network based innovation, particularly at the regional level. On the one hand the programme aims at stimulating broad employee participation and co-operation with researchers within single firms. On the other hand networks – or development coalitions – of firms, research institutions and actors from innovation policy institutions are to be established. In addition the ambitions are to increase scientific knowledge about development and innovation processes and to	Company system Education/research system Political system

					improve the effects of innovation policy instruments.	
17	Programme for incubator activities	2000-2007	20,5 mill	2,5 mill	<p>The objective of the programme for incubator activities is to stimulate the establishment of new firms with growth potential, and thereby to contribute to the development of strong regional and local environments for value creation.</p> <p>An incubator is an environment for the development of firms in the start-up phase. The incubator is located in an established centre of competence, and offers the firms physical premises and a technical infrastructure, advice and guidance on all matters concerning the start-up, and links to wider networks of competence and services, such as research and financial institutions.</p> <p>Any innovation oriented organizations, such as science parks, private firms, and knowledge intensive public enterprises (i.e. hospitals), can be hosts for an incubator.</p> <p>The incubators are open to firms who have a considerable growth potential, and who are in an early phase when support is crucial and the activity is connected with a high risk. The firms are to leave the incubator as soon as they have become well established and economically viable.</p>	Company system
18	International technology co-operation	1999-ending not decided	20 mill	2,4 mill	<p>The objective of this national scheme is to strengthen the international competitiveness of Norwegian firms, by stimulating technology transfer from abroad; mapping the marketing possibilities for technology developed in Norway; and establishing networks and alliances between Norwegian and foreign firms. The target groups are various public institutions, universities and other research</p>	Company system Education/research system

					institutions, as well as firms.	
19	Incubator grant	2001-ending not decided	19 mill	2,3 mill	The aim of the incubator grant is to stimulate to increased establishment of competitive, future-oriented and innovative businesses contributing to innovation and business renewal in general. The incubator grant is a scheme for entrepreneurs located in an incubator. The grant is designated for start-ups with a high knowledge and technology level.	Company system
20	The entrepreneurship programme	2002 – ending not decided	12 mill	1,5 mill	The programme aims at helping knowledge intensive high tech SMEs commercialize their products and introduce them in international markets. The programme offers assistance in the fields of strategy, networking and marketing in the initial phase of commercialization and internationalization.	Company system
21	Women in focus	2000-indefinite	12 mill	1,5 mill	The goal of the measure is to increase the share of women in boards and in the management of SMEs, as well as to increase the share of women establishing their own businesses. The project will make use of women's competences and experiences, especially in areas in need of change and innovation.	Company system Education/research system
22	Programme for Entrepreneurship and Innovation in Norway	2001-2005	8 mill	1 mill	Programme for Entrepreneurship and Innovation in Norway (Program for entreprenørskap og nyskaping i Norge) was initiated by the organization Young Entrepreneurship. The programme is to develop methods, material and networks for the establishment of closer links between educational institutions and industry and the promotion of entrepreneurship in education on all levels. The programme will anchor a nation wide permanent institution which is to develop and implement models and methods for entrepreneurship in education and training in schools, colleges and universitites	Company system

23	Network credit/network bank	1992-indefinite	7,3 mill	0,9 mill	The goal of the measure is to stimulate increased entrepreneurship to create new and profitable workplaces for entrepreneurs with limited capital needs. The measure is in principle sex neutral, but has until now mostly been used by women. The measure was first put into action by the women's committee of the fishing industry in Norway inspired by network banks in Bangladesh.	Company system
24	The Norwegian school of entrepreneurship	1999-ending not decided	5,8 mill (2003) **	0,7 mill (2003) **	The objective of the school is to increase value generation from research based start-ups at institutions of higher learning. The school offers an entrepreneurship education programme aimed at creating a culture where entrepreneurship is applauded.	Company system Education/research system
25	Venture cup	2000-2004	3 mill	0,4 mill	Venture cup is a competition that rewards good business plans.	Company system Education/research system
26	The icebreaking measure	1998-not decided	1 mill	0,1 mill	The goal of the measure is to contribute to increased use of design as a competitive force in Norwegian business life. The goal of the programme is increased understanding of the significance of design, and coordinate initiatives to increase the use of design in Norwegian businesses.	Company system
27	Dynamic local schools		750 000	92 500	The scheme is to stimulate entrepreneurship in order to establish new jobs. The programme is based on cooperation between schools, local authorities and local businesses and aims at teaching kids and young people industrial creativity and entrepreneurship.	Company system
28	Start Norway		150 000 (2003) ***	18 191 (2003) ***	The organisation gathers students for meetings where they can discuss entrepreneurship and get relevant information. The main aim of the organisation is to motivate students to innovation and renewal	Company system



					activities.	
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\* The number denotes the total available capital base

\*\* Annual budget for 2002 is not available

\*\*\* Annual budget for 2002 is not available