

# **EUROPEAN TREND CHART ON INNOVATION**

Country Report:  
Norway

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**EUROPEAN COMMISSION, DIRECTORATE GENERAL ENTERPRISES  
“INNOVATION AND SME” PROGRAMME**

## The European Trend Chart on Innovation

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aiming at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States. The "First Action Plan for Innovation in Europe", launched by the European Commission in 1996, provided for the first time a common analytical and political framework for innovation policy in Europe.

Building upon the Action Plan, the "Trend Chart on Innovation in Europe" is a practical tool for innovation policy makers and scheme managers in Europe. Run by the "Innovation" directorate of DG Enterprises, it pursues the collection, regular updating and analysis of information on innovation policies at national and Community level, with a focus on innovation finance; setting up and development of innovative businesses; the protection of intellectual property rights and the transfer of technology between research and industry.

The Trend Chart serves the "open policy co-ordination approach" laid down by the Lisbon Council in March 2000. It supports policy makers and scheme managers in Europe with summarised information and statistics on innovation policies, performances and trends in the European Union. It is also a European forum for benchmarking and the exchange of "good practices" in the area of innovation policy.

### The "Trend Chart" products

The Trend Chart on Innovation has been running since January 2000. It tracks innovation policy developments in all EU Member States, plus Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, Slovak Republic and Slovenia. The Trend Chart web site ([www.cordis.lu/trendchart](http://www.cordis.lu/trendchart)) will provide access to the following services and publications as they become available:

- a database of policy measures across Europe;
- a "who is who?" of agencies and government departments involved in innovation;
- a series of country reports;
- a series of six-monthly trend reports;
- a number of benchmarking reports on specific themes;
- statistical reports such as the European Innovation Scoreboard;
- the six-monthly newsletters of the Trend Chart;
- the annual reports of the Trend Chart;
- and other publications.

The present report was prepared by **Per Koch** from STEP-Group. The information contained in this report has not been validated in detail by the Member States or by the European Commission.

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## Executive Summary

In the late 1990's Norway witnessed an increased interest in the role of knowledge, research and innovation in industrial development, not only in so-called "high tech" industries like ICT and multi-media, but also in "low tech" – but knowledge intensive – production, like the fisheries and sea farming.

Both the present and the previous government have underlined the need for an increase in national investments in R&D, and Parliament has confirmed that it should be a national goal to reach the OECD average of total R&D investments as percentage of GDP during the next five years. This goal is to be reached by a combination of increase in public investments and the use of instruments that can stimulate companies into spending more on R&D.

One can expect that this policy will strengthen the trend towards giving more priority to public R&D-funds aimed at the general advancement of knowledge, compared to funds allotted directly towards economic development.

Many ministries, as well as the Research Council of Norway, have integrated the systemic view of innovation into their policy strategies. Hence they argue for a more active interaction between companies and R&D institutions and the need for effective learning processes within companies. This thinking has resulted on a wide array of public programmes aimed at making the knowledge flows in the innovation system more effective.

## 1. Innovation Policy in Norway

### 1.1 Overview<sup>1</sup>

("NOK" and "kroner" refers to Norwegian kroner. On May 16. 2000, NOK 100 = EUR 12.2. 1 EUR = 8.2 kroner. All Euro values are approximations.)

#### *GERD*

In 1997, the Norwegian Gross Domestic Expenditure on Research and Development (GERD) amounted to some NOK 18.2 million (EUR 2.25 million), a real increase of 6.5 per cent compared to 1995.

In 1997 the Norwegian GERD's proportion of GDP was 1.7 per cent, compared to an OECD average of 2.2 and an EU average of 1.8. By this measure Norway lags far behind some of its Nordic neighbours. The corresponding numbers for Sweden, Finland and Denmark are 3.9, 2.8 and 2.0 per cent respectively.

Norway spent NOK 4130 per capita on R&D in 1997 (approx. EUR 505), making it number ten on the list of OECD-countries. The OECD average was NOK 4170 (EUR 510), the EU average NOK 3450 (EUR 420) and the Nordic average NOK 5560 (EUR 680).

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<sup>1</sup> Main sources: *Main Science and Technology Indicators 1999/1*, OECD Paris 1999; *Det norske forsknings- og innovasjonssystemet - statistikk og indikatorer 1999*, The Research Council of Norway, Oslo 1999.

<b>Table 1. Sectoral percentage contributions to GERD (1997 figures)</b>	Norway	EU average
Percentage of GERD financed by industry	49.4	53.9
Percentage of GERD financed by government	42.9	37.2
Percentage of GERD financed from abroad	6.5	7.1
Percentage of GERD financed by other national sources	1.2	1.8
Percentage of GERD performed by the Business Enterprise sector	56.9	62.9
Percentage of GERD performed by the Higher Education sector	26.6	20.9
Percentage of GERD performed by the Government sector	16.4	15.3

Government finances a rather large proportion of GERD. The Norwegian government covered 43 per cent of GERD in 1997. The OECD-average was 31 per cent.

### *Internationalisation*

Foreign countries, organisations and firms are becoming increasingly more important both as regards the financing of Norwegian R&D and as providers of R&D financed by Norwegian funds. The proportion of Business Expenditure on Research and Development (BERD) financed from abroad increased from 5.6 per cent in 1995 to 7.6 per cent in 1997. In 1997 foreign firms and institutions invested 1.2 billion kroner in Norwegian R&D (EUR 0.15 billion), while Norway as a whole bought R&D services from abroad for NOK 2.3 billion (EUR 0.3 billion). This number includes expenses connected to the Norwegian participation in international R&D co-operation, counting the EU framework programme.

### *The Institute Sector*

Norway has a very large sector of research institutes. In 1997 this sector spent 4.8 billion kroner (EUR 0.8 billion) on research and development, compared to 4.8 billion in the Higher Education Sector and 8.6 billion (EUR 1 billion) in the Business Enterprise Sector.

There was no increase in R&D expenditure in the Institute Sector between 1995 and 1997. The Higher Education sector and the Business Enterprise sector, however, both increased by approximately 9 per cent.

The institute sector is dominated by the technical-industrial institutes, reporting R&D expenses measuring 2 billion kroner in 1997 (EUR 0.25 billion).

Over 60 per cent of the total R&D activities in the Institute Sector were publicly funded in 1997, while nearly one fourth was financed by industry. 11 per cent came from abroad (including EU funds).

Applied research accounts for roughly 60 per cent of all activities in this sector, basic research 12 per cent.

### *Business Enterprise Sector*

Industry is increasing its investments in R&D. This applies to the R&D performed by the firms themselves and to R&D bought by industry. In 1997 the Business Enterprise Sector invested 8.6 billion kroner in research and development (EUR 1 billion). This represents an increase of more than NOK 1.2 billion compared to 1995 (17 per cent – or 9 per cent in real

terms). In addition Norwegian firms bought R&D services for 4.4 billion kroner (EUR 1.5 billion).

<b>Table 2. Sectoral contributions to BERD</b> (Business Expenditure on Research and Development , 1997, per cent)	Norway	EU average
Percentage of BERD financed by industry	81.4	81.9
Percentage of BERD financed by government	11	9.2
Percentage of BERD financed from abroad	7.6	8.8

Industrial R&D activities are highly concentrated. The manufacturing industry alone spent 4.3 billion kroner on R&D in 1997 (EUR 0.5 billion), accounting for 52 per cent of the aggregate R&D expenditure by the Business Enterprise Sector. A breakdown of the manufacturing industry indicates that the dominant R&D sectors were the chemical, electronics, optical and mechanical industries. These accounted for 67 per cent of the R&D investments in the manufacturing industries, but only 24 per cent of the employment.

The crude petroleum and natural gas sector spent NOK 0.6 billion on intramural R&D.

The service sector used 3.3 billion kroner on R&D in 1997 (EUR 0.4 billion), an increase of NOK 1 billion (sic!) compared with 1995. This is partly due to a sharp increase in R&D investments in the information technology sector, which doubled its investments from 0.6 to 1.4 billion kroner (EUR 0.17 billion). Measured in fixed prizes, this amounts to an increase of 100 per cent.

Nevertheless, compared with the OECD average, the volume of R&D carried out by Norwegian industry is below average. This is largely due to the fact that Norwegian industry to a great extent is based on the production of crude products. This type of production generally has a low level of R&D intensity in all countries.

Experimental development dominates the R&D activity in the industrial sector with 75 per cent.

#### *The Sector of Higher Education*

27 per cent of the country's total investments in R&D go to the universities and colleges. This amounted to 4.8 billion kroner in 1997 (EUR 0.6 billion). The universities' share was 80 per cent, the scientific colleges' 11 per cent and the state colleges' 9 per cent.

The number of students nearly doubled from 1987 till 1997, and as there has been a close relationship between student enrolment and R&D funding, the R&D budgets have increased considerably. The total R&D expenses in this sector grew on average by 4.2 per cent annually between 1981 and 1997.

In the Higher Education Sector basic research accounts for 48 per cent and applied research for 38 per cent of the R&D expenditures. The overall share of basic research is lower in Norway than in most other OECD-countries that measure this proportion.

## Public funding of R&D - GBAORD<sup>2</sup>

As measured by the GBAORD (Government budget appropriations or outlays for R&D) indicator, total government funding of R&D activities in 1999 is estimated to be 9,3 billion NOK, a real increase from 1998 of about 0,5 per cent.

Distributed over socio-economic objectives, GBAORD gives an overall profile of the intentions of funding as expressed by government policy and the primary objectives of the various instruments and programs classified. Hence one may use the distribution of GBAORD over socio-economic objectives as an indicator of the profile of national R&D policies.

With a few exceptions the relative size of GBAORD for non-defence, or civil, purposes is of the same order in several high-income Northern European countries when expressed in per capita terms. With the exception of the UK, most of these countries lie in a narrow band around the average of USD170/cap.

**Table 3: Government budget appropriations for R&D (GBAORD) 1997 for non-defence purposes in OECD countries. PPP\$ pr capita. Source OECD**

	Civil GBAORD/cap 1997 (PPP \$)
<b>Norway</b>	<b>185.2</b>
<i>Denmark</i>	163.7
<b>Finland</b>	<b>228.6</b>
<i>Sweden*</i>	177.9
<b>Nordic countries*</b>	<b>176.0</b>
<i>Belgium</i>	146.4
<i>Netherlands</i>	187.8
<i>France</i>	163.2
<i>Germany</i>	170.3
<b>UK</b>	<b>89.8</b>
<b>EU-15</b>	<b>137.9</b>

\* 1996

Around 75-80 per cent of government appropriations for non-defence purposes in Norway is allotted to the General advancement of knowledge or economic development.<sup>3</sup> The table below suggests that this share has been fairly stable over the last ten years. A further comparison with OECD data shows that with few exceptions this share is more or less of the same relative size among European countries.

<sup>2</sup> This presentation is based on a paper by Johan Hauknes, Svein Olav Nås, Nils Henrik Solum and Finn Ørstavik: *The Norwegian system of innovation – An institutional approach*, STEP Group, Oslo, December 1999.

<sup>3</sup> Here defined as a socio-economic objectives according to the OECD classification.

**Table 4: General advancement of knowledge *and* economic development in GBAORD. Source OECD**

	1989	1994	1997
<i>Norway</i>	75%	77%	78%
<i>Nordic countries</i>	83%	81%	82%
<i>EU-15</i>	78%	76%	76%

The largest share of (civil) GBAORD are appropriations for purposes which are denoted General advancement of knowledge (GAK), as opposed to public R&D funds which are directed at external, more ‘applied’ purposes<sup>4</sup>. These funds include general university funds, together with funds for the general advancement of research. Over the last decade there has been a significant shift in the Norwegian government’s funding of R&D towards these funds, increasing their share in total GBAORD, in 1999 they accounted for almost half the total (49%).

**Table 5: Government budget appropriations for R&D (GBAORD) 1989-1999. Socio-economic objectives. 1990 prices. Mill. NOK. Source NIFU**

	1989	1994	1998	1999
<i>GBAORD</i>	5 969	6 981	7 039	7 099
<i>Share of GBAORD</i>				
<i>General advancement of knowledge</i>	37%	44%	49%	49%
<i>Economic development*</i>	33%	29%	25%	24%
<i>of which Industrial development</i>	16%	15%	12%	12%

\* Includes the GBAORD objectives Development of agriculture, forestry and fishing and Promotion of industrial development and technology, Energy production and use and Transport and telecom development

While these general funds have increased considerably, the proportion allotted to objectives classified as economic development have been substantially reduced. While the two categories of funds were of comparable size in government funding in 1989 (2.1 and 1.9 bill. NOK) the funds aimed at economic development was reduced from  $\frac{1}{3}$  to  $\frac{1}{4}$  of total GBAORD.

While the funds for the objectives General advancement of knowledge have increased by nearly 60 per cent in real terms, funds available for economic development have been reduced by 14 per cent. The part of government appropriations of economic development that were intended for industrial (exc. primary sectors) development was reduced similarly. Allocations for Industrial development were reduced from 980 million 1990-NOK in 1989 to 850 million 1990-NOK ten years later.

<sup>4</sup> Note that this is not an estimate of the distinction between basic research and applied research and development. For a description of these and other socio-economic objectives, see chapter 8 of the OECD Frascati Manual.

The shift is at least partly explainable by the explosive growth of student enrolment in universities and university colleges during the early 1990s<sup>5</sup> and the consequent increase of universities general grants that more or less 'automatically' generates an increase of the GAK component of GBAORD. But as implied above, the development goes beyond this. Even if GAK had increased just on par with other objectives beyond the economic development category, there would still be a substantial redirection of public funds away from these economic purposes.

There does not seem to be any indication of a redirection of public policies and priorities during this period that can explain this. It might be an unintended consequence of the increased funding of HEIs as a consequence of increased student enrolment.

It should be noted that the Ministry of Trade and Industry has met some difficulty in defending its own allocations to industrial R&D during the last couple of years. The fact that the new R&D policy (see below) underlines the need for more long term, basic research, may indicate that the weakening of the funding of direct economic development may continue in the years to come.

### *The Norwegian System of Innovation*

#### **Parliament**

In the parliament or "Storting" the committees dealing most directly with innovation policy issues are:

- The Standing Committee on Education, Research and Church Affairs (*Kirke-, utdannings- og forskningskomiteen*)
- The Standing Committee on Business 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 and co-ordinated, although the Committee on Education, Research and Church Affairs handles broad R&D policy matters.

#### **Government**

Accordingly the responsibility for innovation as well as R&D matters are divided between several ministries. Most ministries allot funds to R&D, the major players being (in brackets: allocations to R&D 2000):

- The Ministry of Education, Research and Church Affairs (4.9 billion kroner)
- The Ministry of Trade and Industry (1.2 billion kroner)
- The Ministry of Health and Social Affairs (0.6 billion kroner)
- The Ministry of the Environment (0.4 billion kroner)
- The Ministry of Defence (0.5 billion kroner)
- The Ministry of Fisheries (0.4 billion kroner)

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<sup>5</sup> While student enrolment in universities and university colleges was about 56 000 in 1989, it increased to 85 000 in 1997. Total student enrolment in HEIs increased from about 123 500 to over 180 000 in the same period.



- The Ministry of Agriculture (0.4 billion kroner)

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

Norwegian R&D policy formulation is based on the so-called “sectorprinciple”, meaning that each ministry is responsible for promoting and funding research activities within their own areas. The Ministry of Education, Research and Church Affairs 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 Forum for Government Officials (*Departementenes forskningsutvalg – DFU*) and the Government’s Research Board (*Regjeringens forskningsutvalg – RFU*). The Minister of Research chairs RFU.

### **The Research Council of Norway**

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.

The Research Council has six relatively autonomous sub-councils (*områdestyrer*) taking responsibility for resource allocation in six sub-areas. These correspond to the six divisions of the Research Council:

- The Bio-production and Processing Division
- The Culture and Society Division
- The Environment and Development Division
- The Industry and Energy Division
- The Medicine and Health Division
- The Science and Technology Division

Its overall annual budget amounts to about 3 billion kroner (EUR 0.37 billion). The Council draws its funds from several ministries, of which the most important are the Ministry of Education, Research and Church Affairs and the Ministry of Industry and Trade. Business development is specified as a goal for about half of the Council’s annual spending.

The Research Council is to be evaluated in 2000 and 2001.

## **The Norwegian Industrial and Regional Development Fund (SND)**

The Norwegian Industrial and Regional Development Fund (*Statens nærings- og distriktsutviklingsfond - SND*) was, like the Research Council, established in 1993 as a reorganisation and reorientation of several pre-existing institutions. It is now the central institution for public funding of industrial and regional development in Norway.

Its main supporters, the Ministry of Trade and Industry and the Ministry of Local Government and Regional Development, provide the general financing of SND's main instruments. These includes grants for innovation and related activities, loans for innovation oriented and other "change-generating" or "turnaround" activities like development and acquisitions of new capital goods, warranties that enable firms to get loans from private institutions, and a general venture fund.

SND is funding establishment of new companies, and supporting newly created firms in the early high-risk period through a venture capital subsidiary. Support is given on the condition of significant private participation. The institution also finances innovation related re-engineering or diversification in larger, more established firms.

On January 1 2000 the State Bank for Agriculture became a part of SND.

Technopolis and the STEP group is now evaluating SND and its instruments.

### **Institutions fostering innovation**

**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 size 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.

**The National Institute of Technology** (*Teknologisk institutt - TI*) 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 development 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.

TI used to be co-operating with **the network of Norwegian Industry Attachés** (*Norges industriattacheer*) administered by the Ministry of Trade and Industry. The Attachés offered assistance in fostering international firm-to-firm co-operation and technology transfer. There were attachés stationed in London, Paris, Stuttgart, San Francisco and Tokyo. This instrument was merged with the new **trade and technology offices** in 1999. These offices are administered by **the Norwegian Trade Council** (*Norges eksportråd*).

**VINN** (*Veiledningsinstituttet i Nord-Norge*, The Advisory Institute in Northern Norway) is a 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.

**SVO** (*Statens veiledningskontor for oppfinnere - Norwegian Government Consultative Office for Inventors*) is a public body that offers advice and scholarships to inventors. The office may support patent applications and the building of prototypes.

### **Other relevant institutions**

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 **Folketrygdfondet** – the Norwegian Public Security Fund. 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 exist 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. Here are some examples of such agencies:

- *Statens forurensingstilsyn* (Norwegian Pollution Control Authority)
- *Statens bygningstekniske etat* (National Office of Building Technology and Administration)
- *Statens legemiddelkontroll* (The drug administration)
- *Justervesenet* (Norwegian metrology and accreditation service)

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 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 Board** (*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. The annual budget is about 105 million NOK (1997). Norway has so far not become a member of the European Patent Organisation (EPO).

**Municipalities and county councils** have traditionally played an important role for 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.

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**

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 (NO\_11). The FORNY-programme is part of the Research Council of Norway's BRO-programme, a programme aimed at fostering networking, technology transfer and innovation.

### **Public programmes, funds and schemes**

The main objective of **the IFU programme** (Industrial Research and Development Contracts) (**NO\_01**) is to 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 product needed by one of the companies (the customer). One of the two should be an SME, and the companies should preferably be located in Norway. However, the customer company (but not the supplier) may be situated abroad. The creation of added value must take place in Norway. The State will support the endeavour financially. There is also a related OFU-programme, where the customer is a public institution.

**The public “user driven” R&D programmes** (*brukerstyrt forskning* – under the Research Council of Norway) (**NO\_02**) is 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. The idea behind this concept is that the enterprises are most familiar with the needs of the market, and that they more easily will recognise opportunities for success and growth. Nevertheless, the policy guiding these programmes stresses the need for close co-operation with universities, colleges and R&D institutes.

Industrial enterprises set the priorities and provide an average of 35 to 40 per cent of the funding required for research in these fields. The research programmes and projects should preferably have a strong potential for created added value, including benefits to society over and above the profits generated in the participating companies. They should contribute to a more knowledge-based industrial structure that will generate long-term returns and rewards.

User driven research has been quite a successful instrument in financing industrial R&D in Norway. The main conclusions from an evaluation made in 1997<sup>6</sup>:

- There is relatively high uncertainty regarding economic return/profitability.
- One can see significant positive effects from investments in competency-building and networking.
- The programmes have probably given fair social returns.
- There is too low additionally and risk in the overall portfolio.

The user driven programmes represent one part of the Research Council of Norway’s industrial R&D programmes, the other part being long-term strategic programmes.

**Enterprise development 2000 (ED 2000)** (*Bedriftsutvikling 2000* – under the Research Council of Norway) (**NO\_26**) focuses on the organisational development of the firm, emphasising the need for co-operation between leaders and staff. The programme shall stimulate companies and research institutions in the same region into co-operating. National R&D resources shall be utilised when deemed necessary. In the last phase of the programme, one will focus on the scientific publishing of results, and the dissemination of results in universities and colleges.

**FAKTA** (The knowledge base of technology and industry policy –*Fakta grunnlaget for nærings- og teknologipolitikken*, under the Research Council of Norway) (**NO\_21**) is to map the innovation system of Norway in order to lay the ground for an effective public technology and industry policy.

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<sup>6</sup> Hervik/Waagø: *Evaluering av brukerstyrt forskning*, BI and NTNU, Oslo/Trondheim 1997.

**The NT-programme** (The Innovation and Technology-programme for Northern Norway, *Nyskaping og teknologi-programmet for Nord-Norge* - under SND) (NO\_03) gives support to innovation in Northern Norway. The programme provides capital and advice and develops networks of companies and knowledge institutions.

**The FRAM programme** (under SND) (NO\_04) 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. FRAM is a spin off of the now defunct BUNT-programme.

**The START fund** (under SND) (NO\_05) is a public seed capital fund that can invest in some 10 newly established firms per year. In addition there has been established four regional Seed Funds. These **Seed Capital Funds** (*Såkorfondene*) are privately owned funds established by private investors, The Ministry of Trade and Industry and SND. The state is supporting these funds by giving them loans equalling 50 per cent of the fund capital. The capital stock is now (2000) 400 million kroner divided between five companies, START included. Furthermore, Parliament has decided that there shall be established one more regional fund in 2000. There is also a fund administered by the Tromsø Science Park.

**The ENT Programme** (Establishment with new Technology, *Etablering med ny teknologi* – under SND) (NO\_06) shall assist newly established firms with advice and financial support in an early phase of the development of their products, processes, services or ideas, hence reducing the risk for the entrepreneur.

**The BIT programme** (Business branch oriented IT-projects for effective management, under SND) (NO\_07) is to improve the profitability and competitive ability of firms by developing common ITC solutions adapted to specific sectors of industry.

SND has also so-called **Innovation funds** (*Nyskapingstilskudd*) (NO\_08) that can be used to support firms in a later phase of the development of an idea or product. This policy tool is often used in combination with **high-risk loans**.

**Project Development Funds** (*Prosjektutviklingstilskudd* – under SND) (NO\_09) is used to support researchers and innovators in developing projects and ideas into plans that can attract potential investors. The funds are primarily targeted towards research and development in the private sector. ICT is given high priority.

**FIIN** (Research and innovation in trade and industry - *Forskning og innovasjon i Næringslivet*) (NO\_20) is a programme directed towards companies that are members of some of the industry associations under of the Confederation of Norwegian Business and Industry (*Næringslivets hovedorganisasjon*). The idea is to stimulate the companies into directing their efforts into the strategic development of innovation practices.

**The FORNY programme** (Programme for commercialisation of R&D business concepts under the Research Council of Norway, administered by the Research Council of Norway and SND) (NO\_11) 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

- Professionalise the process of commercialisation in order to increase the number of – and quality of – concepts in existing companies and/or the process of setting up new innovative companies.
- To turn the commercialisation of research-based business concepts into a strategic area 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, legal and financial.

FORNY is organised as four regional programmes. An evaluation report recommended a more long term and “patient” approach to R&D-based innovation.

### **The BRIDGE programme (*BRO*)**

As this is a report on innovation measures, the BRIDGE programme under the Research Council of Norway deserves special attention. **(NO-10)**

The Norwegian economy has a large number of SMEs that represent new opportunities and new sources of innovation and wealth creation. The Research Council of Norway underlines that for a great number of them, increased contact and long-term collaboration with universities, research institutes and colleges would be advantageous. The Council points out that many SMEs lack the capacity, expertise, connections, financial means and willingness to take the risk required in a globalised economy based on an extensive use of technology.

BRIDGE is to be a bridge-builder for the development of long-term relations and concrete co-operative projects between enterprises with limited R&D experience and various R&D facilities. Efforts are made to strengthen enterprises’ expertise in various ways, in the technological and non-technological spheres alike.

The programme is designed to formulate and test measures that will bridge the gap between enterprises and R&D facilities. These measures are to act as a catalyst, providing impetus so that the practices and information strategies of the R&D facilities are better adapted to the needs of SMEs. Similarly, BRIDGE aims to stimulate co-operation in innovation by helping enterprises, trade organisations, R&D facilities, local authorities and other relevant players to co-operate in establishing innovation networks.

There are several sub-programmes or projects:

**The TEFT programme** (Technology Transfer from R&D institutions to SME’s – under the Research Council of Norway) **(NO\_12)** is to improve SME’s technological development capability by providing impetus and funding for technology projects involving technological research institutions and SMEs. The programme’s most important instrument is a nation-wide, proactive, corps of technology attachés that engage enterprises in direct dialogue, determining their needs and potential.

**SME-Competence** (*SMB-kompetanse*, under the Research Council of Norway) **(NO\_14)** is to strengthen the SME’s ability to innovate and create added value by raising their formal level of competence. The idea is to let the public sector actively create conditions that will enable SMEs to strengthen their knowledge base, thus contributing to national and regional competitiveness, employment and social welfare. It has been considered important to increase the level of co-operation between regional R&D institutions – like R&D institutes and regional state colleges – and companies. A large number of Norwegian colleges are involved

in the project, since they supply project managers and supervisors. In 1998 119 university and colleges candidates spent some time working in companies.

**REGINN** (regional innovation) (**NO\_13**) is to stimulate network-based innovation projects in selected industrial clusters or specific industries. The core of the projects is enterprise-based innovation projects – initiated by the region. Networks are supposed to involve a broad range of relevant players, that is: enterprises, R&D facilities, interest groups and trade organisations, local/regional authorities, public sector programmes etc. REGINN includes elements of an earlier programme called RUSH (Programme for regional development SMEs and regional state colleges, NO\_22).

**SME-Colleges** (*SMB-høgskole*) (**NO\_23**) is to stimulate regional state colleges into co-operating with local industry.

**SME-innovation** (*SMB-innovasjon*) (**NO\_24**). The Research Council has representatives at the regional offices of SND who are to give guidance to local SMEs.

FIIN (NO\_20) and FORNY (NO\_11) used to be part of BRIDGE, but are now separate units under the same department in the Research Council. The same applies to **EU Innovation** (**NO\_25**), the Norwegian “Innovation Relay Centre” within the EU Innovation Programme.

### **R&D performing institutions**

The Norwegian R&D performing system is a tripartite system, with corporate R&D accounting for about 47 per cent of national R&D performance, institutions of higher education (HEI) 27 per cent and a conglomerate sector of public and private contract R&D institutions 26 per cent.

Among the institutions of higher education are:

- 4 public universities  
(The Universities of Oslo, Bergen, and Tromsø and the Norwegian University of Science and Technology in Trondheim)
- 6 public university colleges  
(*Vitenskapelige høgskoler*, including the Norwegian School of Economics and Business Administration and the Agricultural University of Norway)
- 26 state colleges (*Statlige høgskoler*)
- 1 major private institution: The Norwegian School of Management (*BI*)

The state colleges are the result of a substantial reorganisation of regional tertiary education in the early 1990's. They are offering education and carrying out some research and development, mainly within profession-oriented fields like engineering, administration, health care, social sciences and education.

Of the most direct importance from an industrial innovation perspective is the autonomous technological and industrial contract institutes, accounting for about 15 per cent of national R&D. Their R&D is partly funded over the public S&T budgets and partly by the corporate sector. The major supplier of public funding is the Research Council of Norway. These funds are predominantly channelled within the framework of so-called user-driven research and development programmes.



The R&D institute sector is an important part of the Norwegian knowledge system. In 1997 total R&D expenditures in the institute sector were about 4.8 billion kroner, the same size as the R&D expenditures of the institutions of higher education. Of the ca. 200 R&D performing institutions that are surveyed in the biannual R&D surveys of this sector, a much smaller number of institutions represent the major share of the activities. In the 1995 national catalogue of the institute sector 128 institutions are listed as institutions where R&D represents more than 50 per cent of their activities.

More than half of the R&D expenditures in the institute sector is related to industrial and/or technological objectives, of which 47 per cent is performed in national technological RTD institutes or industrial RTD associations.

The R&D institutes are dominantly funded by public sources, including the Research Council of Norway. These funded more than 60 per cent of the R&D expenditures in 1997. The Research Council was responsible for 23 per cent.

**Table 6: Total R&D expenditures in the R&D institute sector 1997**

Mill. NOK	Total R&D exp.	Sectoral shares
R&D related to primary industrial sectors (incl. socio-economic R&D)	740.0	15.3%
Technological and industrial RTD	2 261.6	46.9%
Socio-economic and health R&D	998.1	20.7%
Other R&D	826.9	17.1%
Sum	4 826.6	100.0%

### **The Framework Programme**

It should be noted that although Norway is not a member of the European Union, it is a member of the EU Framework Programme for Research.

### **Innovation-specific indicators**

In the period of 1993 till 1998 the Patent Office registered 33 400 patent applications. 79 per cent of these were submitted by foreign enterprises, 21 per cent by Norwegian parties. Norway has the same proportion of home-based applications per inhabitant as the OECD average.

In the industry 48 per cent of companies with 20 or more employees took part in innovative activities in 1997.<sup>7</sup> The EU/EEA average was 53 per cent.

Norwegian industrial companies invested on average 2.7 per cent of their turnover in innovation activities in 1996/97. The European average was 3.8 per cent. One will find however, that Norwegian companies invest an equal part of their turnover in innovation-related activities as their European competitors, if one compares similar industries. The Norwegian economy is dominated by small and medium sized companies and industries that do not invest much in innovation, regardless of nationality.

20 per cent of total sales consisted of new or altered products in the period 1995 –1997, while in the EU/EEA-area the average was 31 per cent. (EUROSTAT/CIS II)

<sup>7</sup> Oil, gas and fish farming included.

The Norwegian population has all in all positive expectations as regards the usefulness of science and technology. However, a significant proportion is sceptical to biotechnology/genetic research.

Norwegian researchers publish as many scientific articles per inhabitant as the global average. However, the proportion is lower than the Nordic average.

## 1.2 Recent policy events

The Labour government lost the election of 1997, partly due to Prime Minister Thorbjørn Jagland's ultimatum to the voters: the Government would leave office if Labour got less than 36,9 per cent of the votes. The animosity between the urban Conservative Party (*Høyre*) and the agrarian Centre party (*Senterpartiet*) made it impossible to build a broad non-socialist coalition government. In accordance with promises made before the election, the three so called "centre parties" – the Centre Party, the Christian Peoples Party (*Kristelig folkeparti*) and the Liberals (*Venstre*) – therefore formed a small minority government under the leadership of Prime Minister Kjell Magne Bondevik from the Christian Peoples Party.

Surprising even the government parties themselves, the government survived until April 2000, when it had to go on the issue on whether Norway is to build a power plant powered by natural gas. The Labour Party (*Det norske arbeiderparti*), having replaced Thorbjørn Jagland as their candidate for Prime Minister with Jens Stoltenberg, took over.<sup>8</sup>

It is not expected that the shift of government will lead to a radical shift in industrial or innovation policies. The age of the strong ideological conflicts seem to be over in Norway, in the same way as in many other European countries.

However, it should be noted that the Labour Party has a long tradition for state interventionism, a tradition that during the 1980's and 1990's had developed into a belief in a close system of co-operation between the state, the Social Democratic Confederation of Trade Unions and Industry itself. Hence parts of the Labour movement have become strong supporters of public financial support to Industry, even more so than the centre parties – who tend to stress the regional aspect of development – and the Conservative Party (*Høyre*), which would like to see less state intervention.

At the moment there is a struggle going on within the Labour movement, between traditionalist, who – for instance – would like to keep full state ownership of the petroleum company Statoil, and modernists who would like to leave more to the market. The modernists, who include the present Prime Minister Jens Stoltenberg, also promotes the idea of a more effective and flexible public sector, wanting to modernise the public health sector and, presumably, the sector of higher education.

After several years of strong economic growth, the Norwegian economy slowed markedly towards the end of 1998 and in the beginning of 1999. However, employment continued to grow in 1999, and the unemployment rate is now no more than 3.2 per cent. Norway's 4.5 million inhabitants could present a GDP of NOK 1128 billion (approximately EUR 137 billion) in 1999. It is expected to rise by about 3 per cent in 2000.

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<sup>8</sup> Jagland remains party leader. He is now (May 2000) the new government's Minister of Foreign Affairs.

Reflecting higher oil prices, the current budget account balance is projected to show a surplus in 2000 of close to NOK 153 billion (EUR 18.5 billion).<sup>9</sup> The new Labour government is, however, anxious not to overheat the economy, and claims that the main challenge for economic policy in the present situation is to bring price and wage inflation down in line with the main trading partners and to avoid an excessive increase in domestic demand.

According to the latest estimates NOK 133 billion of the state's income will be channelled into the Petroleum Fund (*Petroleumsfondet*), to be invested abroad. The total capital of the Fund is estimated at NOK 360 billion (EUR 43.5 billion), or 27 per cent of GDP, by the end of 2000. The large income generated by the North Sea oil and gas activities makes the Norwegian economy atypical in a European context.

The Government's rather strict economic policy may lead to political unrest, in the party, in Parliament and vis-à-vis the voters. In the autumn of 2000 the party has fallen in the opinion polls. According to several polls the populist Progressive Party (*Fremskrittspartiet*) has become the largest party in Norway. The large national surplus and the strong economy have led to great expectations in the populace at large. This spring Norway faced the largest labour unrest in the private sector since the 1980's. The members of the social democratic Norwegian Confederation of Trade Unions (*Landsorganisasjonen*), turned down a proposal agreed by the leaders of this organisation and the Confederation of Norwegian Business and Industry (*Næringslivets hovedorganisasjon*), on the grounds that the proposed pay rise was too low. This led to a several day's long national strike. The long standing "moderation line" of the Confederation of Trade Unions has probably been weakened.

The Norwegian voters have twice rejected agreements for membership in the EEC/EU. At the moment opinion polls show a more or less equally divided electorate as regards the question of Norway joining the Union. Most commentators agree, however, that a plebiscite might very well lead to another "No". The agrarian Centre party continues to be very much against a Norwegian membership of the EU. The Christian Democrats and the Liberal party are still members of the No-camp, although there are signs that indicate that some of their politicians are considering a new position. The Conservatives and the majority of the Labour Party would like to see a Norwegian membership.

The new foreign minister has indicated that Norway should consider sending in another application for membership during the next period of Parliament (2001 – 2005). He has, however, met strong opposition from inside his own party, especially from the Labour youth organisation. At the recent annual meeting of the Labour Party the leadership managed to hinder a resolution forbidding the party to prepare a membership application during the next parliamentary period.

### **1.3 Innovation policy developments**

Although the Labour Party seems to be a bit more focused on the concerns of the urban manufacturing industries and the need for a strong ICT sector than the outgoing centre government, there seem to be a rather broad consensus as regards innovation policies in Norway.

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<sup>9</sup> Revised National Budget May 2000: The forecasts are based on an oil price assumption of NOK 190 perbarrel in 2000 and NOK 145 in 2001.

### *White Paper on Research*

The previous government's white paper on research and development, *Research at the beginning of a new era* (St. meld. nr. 39 1998-99 *Forskning ved et tidsskille*) was well received, by the various research institutions, by industry as well as by the opposition in Parliament.

The Bondevik-government felt that the investments in Norwegian research should be substantially increased, the aim being to reach a level of research funding equivalent to the OECD average, measured as a proportion of GDP. The growth in public funding is to come partly through increased investment through the National Budget, and partly through the yield of the new fund for research and innovation.

The fund was established in July 1999 with a capital of 3 billion kroner (EUR 363 million). The fund is to contribute to the realisation of government priorities in research policy and to safeguard long-term research and research that cut across sectors. The new Stoltenberg Government has followed up the plans of the Bondevik Government, by increasing the fund capital with NOK 1 billion this year. The Government and Parliament has decided to add another 7.5 billion kroner in 2001, and the final goal is a fund of NOK 10 till 15 million.

The white paper announced that a main priority in the use of public funds in the years ahead should be the strengthening of long-term fundamental research. The Government would, for instance, increase grants for long-term fundamental research channelled through the Research Council of Norway. The white paper also argues for an increase in the basic grants to a number of research institutes.

In addition the Bondevik Government signalled that it would give priority to research in the following areas:

- Marine research
- Information and communication technology
- Medical and health care research
- Research in the area of intersection between energy and the environment

The report to the Storting outlined the principles for a new funding system for the universities and colleges. The aim is to ensure that their budgets to a greater degree is determined on the basis of research needs and science and technology strategies and to a lesser degree be linked to the number of students in each institution, research unit or discipline.

Furthermore, the Government announced that it planned to present a proposal for amending statute law and regulations in order to better commercial exploitation of the R&D results in universities and colleges.

Studies show that the recruitment to Norwegian research will become insufficient within the next few years. There is already a lack of candidates in subjects such as medicine, informatics and the law. The Government therefore suggested an increase in the number of recruitment posts by an average of 150 per year during the next five years.

### *Parliament's response*

All in all Parliament gave strong support to the Government policy, adding, however, that the national goal of reaching the OECD-average as regards the R&D proportion of the GDP must

be considered a minimum.<sup>10</sup> It explicitly asked the Government to increase the public investments in basic science in the universities and colleges “substantially”. The capital of the Fund for Research and Innovation should also be increased “substantially”. The growth in the number of recruits should be at least 150 the first two years of the five years period, thereafter at least 200 per year.

Parliament asked the Government to include a more concrete plan for how this increase should take place in the Revised National Budget in the spring of 2000. It was, however, up to the new Labour Government to pick up this challenge.

### *The New Labour Government*

The new Government’s “Expansion Plan” (*Opptappingsplan*) is included in a special document to the Storting (parliament), accompanying the Revised National Budget of year 2000 (St. prp. Nr. 61 1999-2000). In order to reach the OECD average, the plan says, Norway will have to invest some 9 billion kroner (EUR 1 billion) in the period between 2000 and 2005. Large fluctuations in the GDP will of course move this target.

The Government white paper did not commit the Government as regards how large part of the increase in R&D investments the state ought to shoulder. It did, however, refer to a plan made by the Research Council of Norway, which suggested that public spending should cover 40 per cent of the increase, and that the private sector should cover the rest. Most readers interpreted this to mean that the Government actually planned to take responsibility for 40 per cent.

The Expansion Plan, however, underlines that although one could argue for such a fraction (it is used as an example), it can also be changed during the five year period. Hence, although the Government commits itself to the goal of the OECD average, it does not actually say exactly how much the state is to invest.

Strangely enough, the Plan does say that 1/6 of the new investments should be used in the sector of higher education (1.5 billion, given a total raise of 9 billion kroner). Furthermore, the Research Council of Norway should get another 1/6<sup>th</sup>. It goes without saying that this must be public money. Given that there are other forms of public investments in R&D, this adds up to a public share of the total increase of much more than 33 per cent.

The possibility of reaching the goal of the OECD-average rests on the premise that industry takes its share of the increasing R&D investments. The Ministry of Education, Research and Church Affairs – which was responsible for the white paper on research – did not feel that it had the knowledge base needed to develop policy measures aimed at encouraging industry to invest more. Instead the Ministry of Trade and Industry established a commission in co-operation with the Ministry of Finance and the Ministry of Education, Research and Church Affairs.

### *The Hervik Commission*

The Commission, which was led by Professor Arild Hervik, was asked to consider policy measures that could stimulate an increase in private investments in R&D. The Commission

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<sup>10</sup> Innst. S. nr. 110 (1999-2000)

gave its report to the Bondevik-government on the 8<sup>th</sup> of March 2000 (NOU 2000:7 *Ny giv for nyskaping*).

The Commission proposes that companies investing in certain types of R&D projects should get 25 per cent of the expenses covered by the state, up to a limit of NOK 4 million (EUR 484,000) or 8 million for projects involving universities, colleges and certain R&D institutes. The Commission's majority says this should be given as a tax credit, the minority as direct financial support. This policy measure should be an addition to already existing schemes of support.

The number of doctorate recruits should be increased substantially in the sector of higher education in order to support the demand for new researchers. The Commission underlines the need for investments in new scientific equipment in this sector.

Moreover, the Commission suggests increasing the public investments in R&D programmes targeting the business enterprise sector by 500 million kroner (EUR 60 million). There ought to be an increase in strategic university programmes for basic science, the Commission says, and in SND's high-risk loans.

#### *The Mjøs Commission*

Two months after the Hervik-commission, the Commission of Higher Education, led by Professor Ole Danbolt Mjøs, delivered its report on Norwegian universities and colleges (NOU 2000:14 *Frihet med ansvar*). This Commission was given a very broad mandate, covering most issues concerning higher education. The report includes some very radical and controversial proposals, which has led to much debate in this sector.

The Commission wants to give the state universities and colleges more independence and responsibility. The Commission's majority wants to organise them as independent legal entities fully owned by the state. Today they are an integrated part of the state administration. A reform along these lines would mean that the Ministry of Education and Research no longer could instruct the management of the institutions directly, but would normally have to go through the board of the institutions.

Today most of these boards are elected by the faculty and employees. According to the Mjøs Commission the board members should be appointed by the state. The board is to hire the President or Principal (*Rektor*), taking suggestions from the faculty and staff into consideration. Today the faculty and staff elect the President.

The Commission stresses the need for change in this sector, pointing to the internationalisation of higher education, new forms of teaching and learning, the increasing complexity of the knowledge system, and the need for high quality learning environments, research and development.

An independent institution should, according to the Commission, be given the authority to accredit and evaluate institutions. Colleges that want to become universities or university colleges must fulfil rather strict requirements, but a change of status should be possible. The new Centre for Accreditation and Evaluation is to decide whether they meet the standards of the relevant category (college, university college or university). The same applies to private institutions that receive public support.

The Commission emphasises that the goal of reaching the OECD-average as regards national R&D investments (see above) must be the first step towards a higher goal: Norway should invest as much in R&D as its Nordic neighbours: Sweden, Finland and Denmark. The public support to basic science must be increased considerably and the Fund for Research and Innovation should reach the size of 20 billion kroner (compared to the existing 4 billion).

The Commission proposes a new degree system in Norwegian higher education – one more similar to the Anglo-Saxon model. In the present system studies leading up to a higher degree (*hovedfag*) may take six or more years. The new master degree should take no more than 5 years, including a bachelor degree lasting 3 or 3,5 years. One should, according to the Commission, implement the new system in as many disciplines and professions as possible.

The public support to the state owned universities and colleges should be divided in two parts: one for research and development, another for education. The size of the support for educational purposes should be partly based on the number of students that finish a particular course or education, partly on a voucher system where some funds “follow” the individual student. The grants to R&D is to be decided on the basis of the number of students, quality and results, regional consideration and the national need for knowledge and competence in particular disciplines and fields.

## 1.4 Policy debate

During the first half of the 1990's there was little public debate on R&D and innovation policy in Norway. The Government White Paper on research from 1993 (St. meld. nr. 36 1992-93 *Forskning for fellesskapet*) introduced innovation and systems theory to a larger audience and also stressed the need for larger R&D investments. The document did not give birth to a larger debate, however, and the total national investments in R&D did not rise significantly in real terms between 1989 and 1997. The public investments hovered between 6.1 and 6.6 billion kroner during this period. The general lack of public interest made it difficult for the R&D oriented ministries to defend the public investments against a rather conservative Ministry of Finance, which felt the traditional obligation to curb public spending as much as possible, regardless of type of investment.

Around 1998, however, the interest in R&D policies seemed to be getting stronger. Industrialist demanded an increase in public support for industrial R&D and innovation. The arguments have been based on premises like these:

- The oil and gas will run out. Norway needs new industry that can replace the petroleum sector.
- Norway invests too little in R&D compared to major competitors.
- Norway lacks large knowledge intensive “high tech” sectors, and will find itself behind in the new knowledge-based economy.

The main point here is not whether these arguments are “true” or not. Although Norway lack large high-tech companies, even traditional industries are knowledge-intensive in a broad sense of the term. Moreover, Norway will hardly run out of natural gas in the foreseeable future. Nevertheless, the arguments have struck a cord. Some argue that Norway must build a larger ICT industry, others that one should create a more diversified economy. They all argue for the need for more R&D.

This line of argument has been enforced by complaints from the sector of higher education, especially the universities. The fact remains that the public investments in university

research increased significantly from 1987 till 1997: 54.7 per cent in real terms. Still, the increase was mainly caused by the large influx of students. It is possible that this increase has given the permanent faculty more unfavourable working conditions. There has without a doubt been a serious lack of investment in advanced scientific equipment, and several disciplines find it hard to recruit new doctorates.

While the industrialists tend to stress the need for applied research, the university scientists argue for more public funding to basic science. Still, there seem to be broad agreement on the need for an increase in the funding of university and college research.

There is also a widespread belief that Norwegian research is of a lower quality than research abroad. The Norwegian Academy of Sciences (*Det Norske Videnskaps-Akademi*) recently published a report where it concludes that there are very few scientific milieus of excellence in Norway. The Academy generally paints a gloomy picture of Norwegian research.<sup>11</sup> The studies of the quality of Norwegian research are, however, few and inconclusive, and these are complaints one will find in most countries. Nevertheless, the grievances are clearly based on the real experience of many university scientists, and there is no reason to doubt that several institutes suffer under a serious lack of resources.

The Hervik and Mjøs Commissions (see above) both underlined the need for an increase in public investments in R&D. The Hervik Commission has also suggested tax concessions for firms investing in R&D.

The debate has had an effect. The Storting (Parliament) supported the Bondevik Government's plan for an increase in public and private investments in R&D.

As regards innovation in the enterprise sector, the focus has shifted towards small and medium-sized enterprises during the last decade. Industry and policy-makers have focused on corporate innovation and on the interaction between the factors that contribute to economic development. Norwegian industrial policy studies submitted by the Aakvaag, Henriksen and (the first) Hervik Commissions (all 1996) attached importance to maintaining a broad perspective on innovation.

The Norwegian Government's Long-term Programme for 1998 to 2001 (Report No. 4 1996-97 made by the previous Labour Government) expressed support for adopting a more expertise-based industrial policy, requiring more co-ordination of relevant public sector instruments.

It should be said, however, that although the more systemic innovation perspective has been accepted by most public commissions and policy documents, that does not necessarily mean that this point of view dominates the public debate. The strong support for a more active R&D policy may just as well be an expression of a more traditional, linear, view of R&D and innovation.

## **1.5 Regional policy**

There have always been strong regional interests in Norwegian politics. Hence it has been a national goal to keep the rural areas populated. On the one hand this has led to public

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<sup>11</sup> *Norsk forskning ved sekelskiftet*, Oslo 1999.



subsidies of the agrarian sector, on the other hand to an interest in establishing new industry in the regions – particularly outside the larger cities.

There is a separate Ministry for Local Government and Regional Affairs, which– together with the ministries of industry, petroleum/energy, agriculture and the fisheries– are responsible for economic development and innovation.

The Ministry of Local Government and Regional Affairs has shown great interest in modern innovation theory and the concept of clusters. Hence it has been actively engaged in developing new innovation measures. It is supporting several of the programmes and institutions mentioned above, including FRAM (NO\_04), NT (NO\_03), TEFT (NO\_12) and REGINN (NO\_13).

In the overall budget of SND, funding grants and the risk profile of loans and warranties is in the order of 2.5 billion kroner. Of this some 2/3 are funded through the Ministry of Local Government and Regional Development as an important instrument of national regional development policies. These are targeted at small and medium sized enterprises (SME) and at business development in general, in particular outside the large metropolitan areas. The funds from the Ministry of Trade and Industry are not subject to similar restrictions, but the political pressure to legitimise spending as support for SMEs is notable here, too.

## **2. Fostering an innovation culture**

### **2.1 Education and initial and further training**

A recurrent theme in Norwegian knowledge policy has been the idea of life long learning and the need for employers that have “learned how to learn” and who can adjust their competence to new technologies and changing economic, social and cultural conditions.

In 1996 Parliament asked the Government to present a report on adult education and lifelong learning. The Labour-government appointed a special commission that should look into the case. The Buer Commission (NOU 1997:25 *Ny kompetanse – Grunnlaget for en helhetlig etter- og videreutdanningspolitikk*) paved the way for the Bondevik-governments white paper on “the competence reform” (St. meld. nr. 42 1997-98 *Kompetansereformen*). The Bondevik-government underlined that the public system of education must play an important role in the field of adult education. Government regulations ought to be more flexible, allowing public institutions of higher education to collect fees for courses directed towards adult learning. Parliament agreed.<sup>12</sup>

The Mjøs Commission suggested in its first paper (NOU 1999:17 *Realkompetanse i høgre utdanning*) that the universities and colleges should admit applicants that did not have the formal education needed to apply, but who still had sufficient relevant experience. The suggestion will probably lead to a new law in 2000 or 2001.

The institutions of higher education and industry established in 1999 a network for work-oriented education called University Norway (*Norgesuniversitetet*). University Norway will

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<sup>12</sup> Innst. S. nr. 12 (1998-99)

establish a Web-based database for work-related adult education in the universities and colleges.

In 1999 the Government established a forum for the development of labour skills (*Forum for kompetanseutvikling*) with members from the trade unions, industry and higher education.

It has been difficult to find the sufficient financing for the Norwegian competence reform. The idea has been that the companies and the workers should shoulder their part of the reform. In practice, however, the employees have preferred higher wages to adult education.

In the early 1990's the Research Council of Norway had great success with the so-called BUNT-programme (Business Development Using New Technologies), a "technology pull" programme aimed at improving the companies' ability to find and use new technology from other firms and research institutions. The programme was copied in several other countries.<sup>13</sup> The focus of the programme, however, turned more towards the training of leaders than the direct use of science and technology. Hence SND was given the responsibility for the follow up programme. FRAM (NO\_04). FRAM is explicitly directed towards leaders of SMEs.

## **2.2 Mobility of students, research workers and teachers**

The systemic thinking that now permeates the innovation policy of the Research Council of Norway has led to a new interest for the mobility of students and researchers. The Council had a separate programme that should stimulate the mobility of knowledge workers like this. This aspect has now been integrated in other programs, e.g. SME-Competence (NO\_14) and SME College (NO\_23).

The studies done so far do not indicate that there is a low rate of mobility from the university and colleges to industry in Norway (although the permanent faculty seems rather reluctant to find a career outside campus). On the other hand, relatively few people move the other way, from industry to the institutions of higher education. The researchers in the institute sector are more likely to move into the world of business enterprises.

## **2.3 Raising the awareness of the larger public and involving those concerned**

The Research Council has a special responsibility for the public understanding of science. The Council does this mainly through two channels. First it takes a rather active approach towards the press and broadcasting companies, feeding them relevant science and technology and research policy news.

The Council has two magazines: *Forskning*, a monthly magazine covering Norwegian research and research policy, and the quarterly *Tell'us* magazine, covering Norwegian research and development. *Forskning* is published in Norwegian, *Tell'us* in English.

The Research Council has been very active working with children and youth. It is responsible for a very popular club and competition for children in primary school called

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<sup>13</sup> Partner countries were Portugal, Spain, Germany, Austria, Great Britain, Ireland, Denmark, Finland and Sweden. The partners have worked together in a network, supported by the European Commission.

*Nysgjerrigper* (Curious Tom). Teachers use *Nysgjerrigper*-related material extensively in their work. The club has now 100 000 members.

The Research Council is also involved in *Stiftelsen ungdom og forskning* (The Foundation for Youth and Science). Through this foundation – and in co-operation with *Forbundet Unge Forskere* (an independent youth-organisation for science-related activities)– it arranges the annual competition “Unge Forskere” (Young Scientists).

*Forskningsdagene* (The Norwegian Research Week) is an annual festival involving many of the country’s universities, colleges, institutes and companies. The objective of the Research Week is to promote interest in research, and help people appreciate its content, purpose and importance for Norway. Research week events may target special groups, but more often a general public. Lectures, debates, demonstrations, exhibitions, cultural events, even shows and fairs, comprise the program as the research institutions open their doors to the public.

## **2.4 Fostering innovative organisational and management practices in enterprises**

The now defunct BUNT-programme was considered very successful in improving company leader’s ability to find, integrate and utilise science and technology related knowledge. The successor to BUNT, called FRAM (NO\_04), is more focused on supporting basic learning within SMEs in general, particularly in the field of leadership and the building of company strategies.

The development of leadership and organisational skills are integrated parts in several programs, including FIIN (NO\_20) and ED 2000 (NO\_26).

## **2.5 Public authorities and support to innovation policy makers**

One of the tasks of the Research Council of Norway is to give the Government advice on R&D policy matters. It has a separate Strategic Division with a Department of Research Policy that is developing the research policy strategies of the Council.

The Council also provides the Ministries and others with various reports and publications on Norwegian research and research policy, the major one being the biannual report on statistics and indicators (*Det norske forsknings- og innovasjonssystemet - statistikk og indikatorer*).

The Council makes use of three research institutes in general:

- Norsk institutt for studier av forskning og utdanning (Norwegian Institute for Studies in Research and Higher Education – NIFU)
- The STEP-group (Studies in technology, innovation and economic policy)
- Statistisk sentralbyrå (Statistics Norway)

The Research Council has a separate programme, called FAKTA, aimed at the development of innovation policies (NO\_21). The programme's objective is to improve the factual basis for taking decisions on Norway's industrial and technology policy based on an interactive understanding of innovation. The programme is intended to provide more and better background information for political decisions and for planning at different levels of government and at the Research Council.

One important goal of FAKTA is to develop knowledge that can facilitate strategies to get more enterprises to use R&D systematically as a means to promote growth. Another ambition is to improve the level of professional expertise in the research communities that participate in the programme.

The utility value of these efforts is mainly related to the decision-makers responsible for the general conditions underlying industry and technology policies. The research is to support the development of policy instruments in ministries, public sector programmes, employee and employer organisations and the like, so that these bodies will have a better factual basis for their formulation of policies.

Important R&D tasks under this programme are:

- Profitability, growth and the development of expertise as a result of R&D and innovation
- Entrepreneurial efforts and intrapreneurial efforts
- Corporate demographics and case studies

## **2.6 Promotion of clustering and co-operation for innovation**

There is great interest in innovation systems theory and the concept of clusters in the Research Council of Norway as well as in several ministries (especially in the Ministry of Industry and Trade and the Ministry of Regional Affairs). This has led to the establishment of several instruments that shall encourage networking and the distribution of knowledge, competence and personnel in various parts of the innovation system.

This applies to programmes like:

- The IFU programme (Industrial Research and Development Contracts) (NO\_01)
- The NT-programme (The Innovation and Technology-programme for Northern Norway) (NO\_03)
- Enterprise development 2000 (*Bedriftsutvikling 2000*) (NO\_26)
- The BRIDGE programme (*BRO*) (NO-10)
- The public “user driven” R&D programmes under the Research Council of Norway

## **3. Establishing a framework conducive to innovation**

### **3.1 Competition**

The liberalisation of markets is not at the core of the ideology of the present Labour Government – nor was it for the previous Centre Government. Nevertheless, there is a widespread understanding that there is a need for more deregulation and more open and flexible market conditions, and that Norwegian firms must compete on equal terms with foreign competitors. After all, Norway is a small country with a very small home market. Moreover, Norway is part of the European Economic Area, and must follow the rules laid down by the EU in this respect.

The “modernists” in the Labour Party (the Prime Minister included) would like to harness the market forces to benefit the social welfare state. Hence large state companies have been– or will be – turned into joint-stock companies. The state-owned telecom company Telenor will now – after the failed merger with Swedish Telia – float its stock on the stock market.

The Prime Minister wants to privatise a proportion of the state-owned Statoil Petroleum Company. He met fierce resistance in parts of the Labour party, but did get the annual party meeting to agree on a partial privatisation. The fact that the party will go for such a move gives an indication of the shift that has taken place in Norwegian policies during the last decade.

It should be noted, however, that this is not necessarily the same as encouraging increased competition in the home market. Large parts of the Norwegian economy is quite open already, others – like agricultural production – is not.

### **3.2 Protection of intellectual and industrial property**

The Patent Board (*Styret for det industrielle rettsvern - Patentstyret*) offers protection for inventions, trademarks and designs and offer information services, guidance and training in the area of industrial property rights. The annual budget is about 154 mill NOK (EUR 19 mill, 2001). Norway is still not member of of the European Patent Organisation EPO. Norway has endorsed the WTO-agreement on trade-related aspects of intellectual property rights (TRIPs), but not the European Patent Convention of 1973 (EPC).

It seems that Norwegian Companies does not take full advantage of the protection patents and the registering of trademarks and designs can give. 80 per cent of the patent applications handled by the Norwegian Patent Board is from foreign applicants. The previous government underlined the need to increase the companies' knowledge of intellectual property rights, and to improve the quality of patent applications. In 1999 the Patent Board implemented an information programme targeted towards small enterprises.

In the Government White Paper on Research (St. meld. nr. 39 1998–99) the previous government expressed the need to ensure a more effective commercialisation of university and college R&D. On January 28 2000 it appointed a special commission (“the Bernt Commission”) that is to suggest instruments and regulatory reform that might stimulate to a more active industrial utilisation of university and college research.

The Government signalled that it would consider ending the so-called “faculty exception” (*lærerunntaket*) in the present law on the property rights for invention. This law states that university and college teachers keep full ownership of any invention made while working at their institution. Denmark has already changed a similar law, Sweden and Finland are looking into the matter.

The Science Parks are actively helping university and college researchers patenting, developing and marketing their inventions vis-à-vis industry.

### **3.3 Administrative simplification**

The previous government underlined the need for administrative simplification, helping new and small enterprises cut through the red tape. It implemented a special programme called “A more uncomplicated Norway” (*Et enklere Norge*) that shall reduce the number of regulations and registration forms. The Brønnøysund Register Centre (*Brønnøysundregistrene*), the Directorate of Taxes (*Skatteetaten*) and Statistics Norway (*Statistisk sentralbyrå - SSB*) will establish a common gateway for electronic reporting on business related information.

There is a public web portal, Bedin, which gives information on how to establish and register a new company.

### **3.4 Amelioration of legal and regulatory environments**

As a member of the European Economic Area, Norway is adapting EU regulations. There is a concern that especially new small companies are hindered by excessive regulations (see 3.3).

### **3.5 Innovation financing**

Like many European countries Norway lacks private sources of venture capital comparable to the ones of the United States. The Norwegian Industrial and Regional Development Fund (*Statens nærings- og distriktsutviklingsfond - SND*) is given the responsibility for co-ordinating the public instruments for financial support to industry research and innovation. Among these are (cp. page 11):

- The START fund (NO\_05) and four related regional funds.
- The ENT Programme (Establishment with new Technology) (NO\_06)
- Innovation funds (NO\_08)
- Project Development Funds (NO\_09)
- NUMARIO (under SND and the Research Council of Norway) (NO\_17), which is to support the development the Norwegian fish farming industry.
- The Public Fund for the Environment is giving loans to companies using and developing “green” technologies.

### **3.6 Taxation**

The Ministry of Finance has been extremely reluctant to consider any form for tax deductions for investments in innovation and research, beyond the standard one-time deduction that is common to all investments of this kind. The Ministry is afraid that special tax concessions will undermine annual budget control.

However, the present as well as the previous government have committed themselves to a large increase in national investments in R&D, and so has Parliament. Unless the public sector is to take the major burden of this increase, the government will have to find ways of stimulating industry into investing more in R&D. Hence the Bondevik-government asked the Hervik-Commission to propose relevant measures, including tax concessions (for the Hervik proposals, see page 20).

As Norwegian industry is dominated by small enterprises that find it hard to do any major investments in R&D, there is in some industries implemented special duties for R&D. The money collected is used on R&D directed towards that particular industry. This year there will be a new duty in the fishing and sea-farming sector.

## **4. Gearing research to innovation**

### **4.1 Strategic vision of research and development**

*Research at the beginning of a new era*, The Government White Paper on research and development of June 1999 (St. meld. nr. 39 1998-99, cp. page 19) announced that the main priority in the use of public funds in the years ahead will be the strengthening of long-term and fundamental research. In addition the authorities will give priority to increased research commitment in the following areas:

- Marine research
- Information and communication technology
- Medical and health-care research
- Research in the are of intersection between energy and the environment

Parliament has supported these priorities.

There is no Norwegian equivalent to the Foresight Programme, although the Research Council from time to time publishes updates to its R&D policy strategy (*Research for the Future - Forskning for fremtiden*).

### **4.2 Strengthening research carried out by companies**

The major instrument in this field is the user-driven R&D programmes (NO\_02, cp. page 12 above). Industrial enterprises set their priorities and provide an average of 35 to 40 per cent of the funding for research under these programmes.

Norwegian companies also take part in EU programmes.

### **4.3 Start-up of technology-based companies**

The Science Parks (page 11) play an important role in encouraging the establishment of new technology-based companies, including university and college spin-offs. They are the local representatives of the FORNY-programme (NO\_11, cp. page 14 above), which is to improving the ability to commercialise research-based business concepts or ideas conceived at universities, colleges and research institutes.

### **4.4 Intensified co-operation between research, universities and companies**

The Government White Paper on Research underlines the need for co-operation between companies and R&D institutions.

The public user-oriented R&D programmes are to strengthen the collaboration between firms and universities, colleges and R&D institutes (NO\_02). The NT-programme (NO\_03, page 13 above) is to develop network between companies and knowledge institutions, and so is FORNY (NO\_11), TEFT (NO\_12), SME-Competence (NO\_14), REGINN (NO\_13) and SME-Colleges (NO\_23) (cp. BRIDGE above, page 14).

## **4.5 Strengthening of the ability of companies, particularly SMEs, to absorb technologies and know-how**

As Norwegian innovation policies are based on a systemic view of innovation processes, the idea of strengthening the ability of companies to absorb technologies and know-how is an integrated part of several of the programmes mentioned under 4.4, especially the programmes gathered under BRIDGE (NO\_10, page 14 above). BRIDGE is to be a bridge-builder for the development of long-term relations and concrete co-operative projects between enterprises with limited R&D experience and various R&D facilities. Efforts are made to strengthen enterprises' expertise in various ways, in the technological and non-technological spheres alike.

Other relevant programmes are Enterprise development 2000 (NO\_26), FORNY (NO\_11) and FRAM (NO\_04).



## 5. List of TREND CHART measures

Code	Title	Start/end dates	Action plan area(s)	Old/new/modified/extended etc.
NO_01	The IFU Programme	1994 - permanent	III.5	
NO_02	User Driven Research Programmes	permanent	I.4, III.5, III.2, II.5	
NO_03	The NT-programme	1987 - 2000	I.4, III.5, I.6	
NO_04	The FRAM programme	1992 - 2002	I.4	
NO_05	The START fund	1998	II.5	
NO_06	The ENT programme	1991 -	I.4	
NO_07	The BIT programme		I.4	
NO_08	SND's innovation funds		II.5	
NO_09	Project Development Funds		III.3	
NO_10	The BRIDGE Programme		I.6, III.3, III.4, III.5	
NO_11	The FORNY Programme	1994-2003	III.4, III.3	
NO_12	The TEFT programme (part of BRIDGE)	1994-2003	III.4, III.5	
NO_13	REGINN (part of BRIDGE)	1997-2000	I.6	
NO_14	SME Competence (part of BRIDGE)	1997-2000	III.4	
NO_15*				
NO_16*	The Seed Capital Funds (are included in NO_5) *		II.5	
NO_17	Assistance applications for patents			
NO_18	Regional Development Grants			
NO_19	Municipal Business Development Funds		III.3	
NO_20	FIIN (under BRIDGE)		I.4	
NO_21	FAKTA	1997 - 2000	I.5	

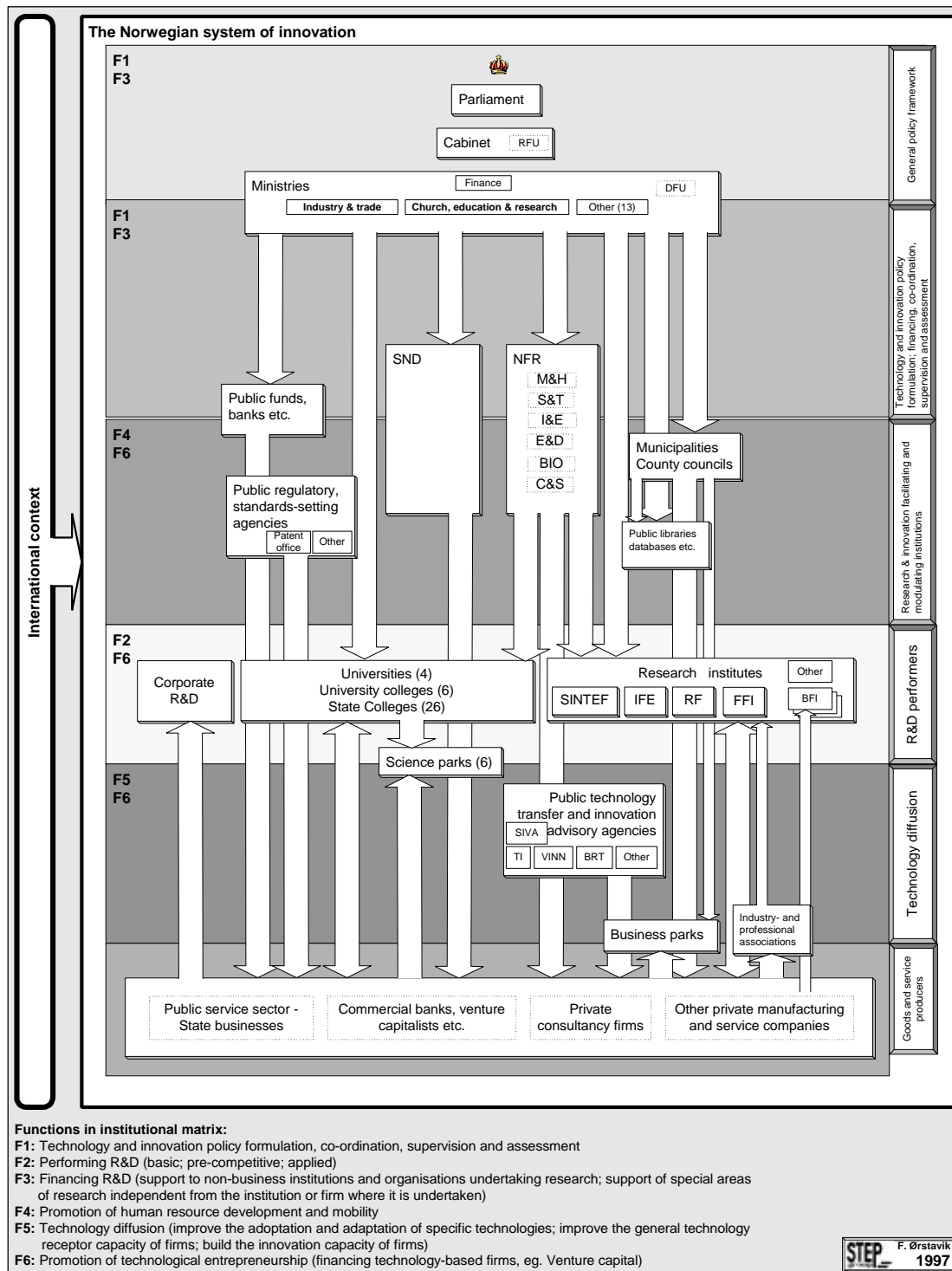
NO_22	RUSH		II.4, III.5	
NO_23	SME Colleges (under BRIDGE, is part of SME-competence NO_14)		III.4	
NO_24*	SME innovation (under BRIDGE) see NO_10 *		I.4, III.4	
NO_26	Enterprise development 2000		I.4	

\* There are no templates for these measures as they are only marginally relevant, because they are included under another measure or because they were discontinued before Norway started reporting.

## 6. Who is who in Innovation

Under this heading we present the main actors in Norwegian innovation policy (compare the presentation of the Norwegian system of innovation above page 7)

Below find a policy-centred organisational map of the Norwegian system of innovation (Figure 1). RCN = The Research Council of Norway,



## 6.1 General Policy Making Institutions

### **Parliament (Stortinget)**

The Storting's Administration

Karl Johans gt. 22

N-0026

Norway

+ 47 23 31 30 50

<http://www.stortinget.no/english/index.html>

In the Parliament the committees dealing most directly with innovation policy issues are:

- The Standing Committee on Education, Research and Church Affairs (*Kirke-, utdannings- og forskningskomiteen*)
- The Standing Committee on Business and Industry (*Næringskomiteen*)
- The Standing Committee on Energy and the Environment (*Energi- og miljøkomiteen*)

### **Ministries**

Like in other Nordic countries all ministries support R&D related to their own area. The Ministry of Education, Research and Church Affairs, The Ministry of Industry and Trade and the Ministry for Local Government and Regional Affairs have the main responsibility for the development of national innovation policies. The Ministry of Education, Research and Church Affairs is to co-ordinate the development of national R&D policies, and has the main responsibility for basic research.

### **Royal Ministry of Education, Research and Church Affairs**

Department of Research

P.O. Box 8119 Dep.

N-0032 Oslo

+47 22 24 74 61

<http://www.odin.dep.no/kuf/>

For information on innovation oriented activities, contact **Espen Solberg**, at +47 22 24 75 44, e-mail: [eso@kuf.dep.no](mailto:eso@kuf.dep.no)

### **Royal Ministry of Trade and Industry**

Department of Research, Technology and Competence

P.O. Box 8014 Dep.

N-0030 Oslo

+47 22 24 03 01

<http://www.odin.dep.no/nhd/>

The Ministry of Trade and Industry will be reorganised shortly. It has recently taken over the responsibility for the Norwegian participation in the EU Framework programme from the Ministry of Education, Research and Church Affairs.

For innovation oriented activities, contact **Carl Huitfeldt** at +47 22 24 66 09, e-mail: [carl.huitfeldt@nhd.dep.no](mailto:carl.huitfeldt@nhd.dep.no).

### **Royal Ministry for Local Government and Regional Affairs**

Department of Regional Policy

P.O. Box 8112 Dep.

N-0032 Oslo  
+47 22 24 70 01  
<http://www.odin.dep.no/krd/>

For innovation oriented activities, contact **Morten Gulsrud**, at +47 22 24 70 47, e-mail: [morten.gulsrud@krd.dep.no](mailto:morten.gulsrud@krd.dep.no)

**Royal Ministry of Fisheries**  
Department of Administration  
P.O. Box 8118 Dep.  
N-0032 Oslo  
+47 22 24 64 11  
<http://odin.dep.no/fid/>

**Royal Ministry of Agriculture**  
Department of Administration and Economy  
P.O. Box 8007 Dep.  
N-0033 Oslo  
+47 22 24 91 11  
<http://odin.dep.no/ld/>

## **6.2 Bodies of Technology and Innovation Policy Formulation and Implementation**

### ***The Research Council of Norway***

The Research Council of Norway (*Norges forskningsråd*) bears overall responsibility for national research strategy, and manages nearly one third of public-sector research funding.

The Research Council of Norway  
P.O. Box 2700  
St. Hanshaugen  
0131 OSLO  
+47 22 03 70 00  
<http://www.forskningsradet.no/>

For information on innovation oriented programmes, contact **Marit C. Synnevåg** at +47 22 03 72 31, email: [mcs@forskningsradet.no](mailto:mcs@forskningsradet.no)

### ***The Norwegian Industrial and Regional Development Fund (SND)***

SND is the central institution for public funding of industrial and regional development in Norway.

SND  
P.O. Box 448 Sentrum  
N-0104 Oslo  
+47 22 00 25 00  
<http://www.snd.no/>

For more information on various instruments and programmes, contact **Randi Olsen** at +47 22 00 27 23.

### **6.3 Institutions fostering innovation**

#### ***SIVA - The Industrial Development Corporation of Norway***

SIVA (*Selskapet for industrivekst*) is established to further the creation of business opportunities, and increased employment.

SIVA  
N-7462 Trondheim  
+47 73 54 62 00  
<http://www.siva.no/>

#### ***TI - The National Institute of Technology***

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.

National Institute of Technology  
P.O. Box 2608 St.Hanshaugen  
N-0131 Oslo.  
+47 22 86 50 00  
<http://www.teknologisk.no/>

#### ***VINN***

VINN is a contract research and consulting institute. The foundation offer services within several technical and economical/administrative areas.

VINN  
P.O. Box 253  
N-8501 Narvik  
+47 76 96 72 00  
<http://www.vinn.no/>

#### ***Science Parks***

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

Go to <http://www.fin.no/> for more information.

### **SVO - Norwegian Government Consultative Office for Inventors**

SVO is a public body that offers advice and scholarships to inventors.

SVO

P.O. Box 100

N-1300 Sandvika

+47 67 80 87 50

<http://www.svo.no/>

## **6.4 Research Institutions**

Go to <http://www.nifu.no/instkat/engstartside.shtml> for an online catalogue of non-university research institutes. A French version can be found at <http://www.nifu.no/instkat/frastartside.shtml>.

A list of universities and scientific colleges can be found at [http://www.forskningsradet.no/panett/lenke\\_utdrag.html/kategori=17](http://www.forskningsradet.no/panett/lenke_utdrag.html/kategori=17). Go to [http://www.forskningsradet.no/panett/lenke\\_utdrag.html/kategori=19](http://www.forskningsradet.no/panett/lenke_utdrag.html/kategori=19) to find information on the state colleges.

The major institutes in the field of R&D and innovation policy are:

Norwegian Institute for Studies in Research and Higher Education

Hegdehaugsveien 31

N-0352 Oslo

+47 22 59 51 00

<http://www.nifu.no/>

STEP-group (Studies in technology, innovation and economic policy)

Storgaten 1

N-0155 Oslo

+47 22 47 73 10

<http://www.step.no/>

Statistics Norway (Statistisk sentralbyrå)

[Kongens gt. 6, Oslo](http://www.ssb.no/)

Postboks 8131 Dep, 0033 Oslo

22 86 45 00

22 86 49 73

<http://www.ssb.no/>

## 6.5 Lobby organisations

The Norwegian Confederation of Trade Unions (*Landsorganisasjonen - LO*, social democratic).

Youngs gate 11  
N-0181 Oslo  
+47 23 06 10 50  
<http://www.lo.no/>

The Confederation of Norwegian Business and Industry (*Næringslivets hovedorganisasjon - NHO*)

P.b. 5250 Majorstua  
N-0303 Oslo  
+47 23 08 80 00  
<http://www.nho.no/>

Union of Researchers (*Forskerforbundet*)

Tollbugt. 35  
0157 Oslo  
+47 21 02 33 00,  
<http://www.forskerforbundet.no/>

## 6.6 Other public actors

The Nordic Industrial Fund (*Nordisk Industrifond*) is the collaborative body for the Nordic countries in industrial research and development (R&D). The Fund is to stimulate, initiate and finance R&D in Nordic industry.

Nordic Industrial Fund  
Nedre Vollgate 8  
N-0158 Oslo  
Norway  
+47 22 82 86 00  
<http://www.nordisk-industrifond.no/english/indexe.htm>

The Norwegian Patent Board (*Styret for det industrielle rettsvern - Patentstyret*)

Postboks 8160 Dep.  
N-0033 Oslo,  
+47 22387300  
<http://www.patentstyret.no/>



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*Main Science and Technology Indicators*, No 1 and 2, OECD 1999.

*Norges forskningsråd Årsmelding 1998* (The Research Council of Norway, general annual report 1998) <http://www.forskningsradet.no/bibliotek/publikasjoner/arsmeld98/>, English version: [http://www.forskningsradet.no/engpub/publikasjoner/arsmeld98\\_eng/](http://www.forskningsradet.no/engpub/publikasjoner/arsmeld98_eng/)

*Norges forskningsråd Årsrapport 1999* (The Research Council of Norway, annual report to the ministries) 1999, <http://www.forskningsradet.no/bibliotek/publikasjoner/arsrapport99/index.html>

*Norsk forskning ved sekelskiftet, Tid for gjennomtenkning*, Det Norske Videnskaps-Akademi, Oslo 1999.

*Ny giv of nyskaping, vurdering av tiltak for økt FoU i næringslivet* (Hervik Commission, Green paper on private R&D), NOU 2000:7, <http://odin.dep.no/nhd/norsk/publ/utredninger/NOU/024001-020004/index-dok000-b-n-a.html>

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<http://odin.dep.no/bud2000/> English summary: <http://odin.dep.no/bud2000/nbe/>

St.prp. nr.1 (2000-2001) National budget for year 2001, various ministries.  
<http://odin.dep.no/bud2001/> English summary: <http://odin.dep.no/bud2001/engkort.pdf>

Ørstavik, Finn: *The historical evolution of innovation and technology policy in Norway*, STEP A-04 1999.

## 8. List of Web addresses

BEDIN	BEDIN (Business information on the Internet)	<a href="http://www.bedin.no/">http://www.bedin.no/</a>
BRO	BRIDGE programme	<a href="http://www.sol.no/forskningsradet/program/bro/">http://www.sol.no/forskningsradet/program/bro/</a>
Brønnøysundregistrene	The Brønnøysund Register Centre	<a href="http://www.brreg.no/">http://www.brreg.no/</a>
Departementene	Ministries	<a href="http://odin.dep.no/">http://odin.dep.no/</a>
FIIN	FIIN	<a href="http://www3.nho.no/fiin/hoved.html">http://www3.nho.no/fiin/hoved.html</a>
Folketrygdfondet	The Norwegian Public Security Fund	<a href="http://www.ftf.no/">http://www.ftf.no/</a>
Forskning	<i>Forskning</i> (the Research Council magazine)	<a href="http://www.forskningsradet.no/bibliotek/forskning/">http://www.forskningsradet.no/bibliotek/forskning/</a>
Forskningsdagene	The Research Week	<a href="http://www.forskningsdagene.com/for side.html">http://www.forskningsdagene.com/for side.html</a>
Forskningsparkene i Norge	Science Parks in Norway	<a href="http://www.fin.no/">http://www.fin.no/</a>
FoU-statistikk	R&D statistics (in Norwegian)	<a href="http://www.nifu.no/foustat/">http://www.nifu.no/foustat/</a>
Instituttkatalogen	Institute sector - catalogue	<a href="http://www.nifu.no/instkat/engstartside.shtml">http://www.nifu.no/instkat/engstartside.shtml</a>
Instituttkatalogen	Institute catalogue in French	<a href="http://www.nifu.no/instkat/frastartside.shtml">http://www.nifu.no/instkat/frastartside.shtml</a>
Justervesenet	Norwegian metrology and accreditation service	<a href="http://www.justervesenet.no/">http://www.justervesenet.no/</a>
Kommunalbanken AS	(public bank for regional affairs)	<a href="http://www.kommunalbanken.no/eng/default.asp">http://www.kommunalbanken.no/eng/default.asp</a>
NIFU – Norsk institutt for studier av forskning og utdanning	Norwegian Institute for Studies in Research and Higher Education	<a href="http://www.nifu.no/">http://www.nifu.no/</a>
Norges eksportråd	Norwegian Trade Council	<a href="http://www.eksportnett.ntc.no/">http://www.eksportnett.ntc.no/</a>
Norges forskningsråd	The Research Council of Norway	<a href="http://www.forskningsradet.no/">http://www.forskningsradet.no/</a>

Norway.org	Norway.org On Norway in English	<a href="http://www.norway.org/">http://www.norway.org/</a>
Nysgjerrigper	Curious Tom	<a href="http://www.forskningsradet.no/fag/andre/nysgjerrigper/index.html">http://www.forskningsradet.no/fag/andre/nysgjerrigper/index.html</a>
SIVA	The Industrial Development Corporation of Norway	<a href="http://www.siva.no/">http://www.siva.no/</a>
Skatteetaten	Directorate of Taxes	<a href="http://www.skatteetaten.no/">http://www.skatteetaten.no/</a>
SND	The Norwegian Industrial and Regional Development Fund	<a href="http://www.snd.no/">http://www.snd.no/</a>
Statens bygnigstekniske etat	National Office of Building Technology and Administration	<a href="http://www.be.no/">http://www.be.no/</a>
Statens forurensingstilsyn	Norwegian Pollution Control Authority	<a href="http://www.sft.no/">http://www.sft.no/</a>
Statens legemiddelkontroll	(drug administration)	<a href="http://www.slk.no/">http://www.slk.no/</a>
Statens veiledningskontor for oppfinnere (SVO)	Norwegian Government Consultative Office for Inventors	<a href="http://www.svo.no/">http://www.svo.no/</a>
Statistisk sentralbyrå (SSB)	Statistics Norway	<a href="http://www.ssb.no/">http://www.ssb.no/</a>
STEP	STEP-group	<a href="http://www.step.no/">http://www.step.no/</a>
Stiftelsen Ungdom og Forskning, Forbundet Unge Forskere	Young Scientists	<a href="http://www.unge-forskere.no/">http://www.unge-forskere.no/</a>
Styret for det industrielle rettsvern – Patentstyret	The Norwegian Patent Board	<a href="http://www.patentstyret.no/">http://www.patentstyret.no/</a>
Teknologisk institutt	The National Institute of Technology	<a href="http://www.teknologisk.no/">http://www.teknologisk.no/</a>
Tell'us	<i>Tell'us</i> (English magazine on Norwegian R&D)	<a href="http://www.forskningsradet.no/bibliotek/tellus/">http://www.forskningsradet.no/bibliotek/tellus/</a>

## 9. Key Policy Documents

### *Forskning ved et tidsskille*

**Name:**

*Research at the beginning of a new era* (St. meld. nr. 39 1998-99 *Forskning ved et tidsskille*).  
Government White Paper on Research.)

**Published:**

June 1999

**Produced by/primary agency responsible:**

Ministry of Education, Research and Church Affairs.

**Presentation of Analysis:**

The white paper analyses the whole Norwegian knowledge system, from university and college research to industrial innovation activities

**Indicators - figures, sources and benchmarks:**

The white paper uses R&D and innovation indicators from Norwegian institutes like NIFU, Statistics Norway and STEP, as well as OECD data.

**Objectives, time horizon, relationship to EU Action Plan:**

In the course of five years Norway should reach a level of national R&D funding equivalent to the OECD average, measured as proportion of GDP.

A research and innovation fund is to be established.

A main priority in the use of public funds in the years ahead will be the strengthening of long-term fundamental research. In addition the authorities will give priority to increased research commitment in the following areas:

- Marine research
- Information and communication technology
- Medical and health-care research
- Research in the area of intersection between energy and the environment

The Norwegian participation in international joint commitments will continue. The benefits from being a member of the EU Framework programmes are substantial, but ought nevertheless to be increased further.

Quality in research is to be promoted and rewarded.

For an analysis of its political implications, see page 19 of this document.

Online Norwegian version: <http://odin.dep.no/kuf/norsk/publ/stmeld/014005-040026/index-dok000-b-n-a.html> English summary at <http://odin.dep.no/kuf/engelsk/publ/stmeld/014005-990480/index-dok000-b-n-a.html>

### **Hervik Commission**

#### **Name:**

*Ny giv for nyskaping - Vurdering av tiltak for økt FoU i næringslivet* (A New Start at Innovation – Analysis of instruments for increasing private investments in R&D) NOU 2000:7.

#### **Published:**

By Statens forvaltningstjeneste in Oslo 2000. It was made public on March 8 2000.

#### **Produced by/primary agency responsible:**

This is a report commissioned by the Ministry of Industry and Trade, The Ministry of Finance and the Ministry of Education, Research and Church Affairs. It was produced by a Commission led by Professor Arild Hervik.

#### **Presentation of Analysis**

Given the goal of reaching the OECD average as regards national investments in R&D, there is a need for instruments that can stimulate industry into spending more on science and technology. The report gives an overview over the present situation in Norway and selected OECD countries. It discusses theoretical and practical aspects of various instruments and models of thinking.

#### **Indicators - figures used, sources and benchmarks:**

The report makes use of a wide array of economic and innovation oriented statistics and indicators. Among the appendixes there is an historical presentation of R&D in the Norwegian industry and a paper on the relationship between taxes and R&D. There is a broad analysis of the relationship between private R&D investments and law and regulations. The report includes a rich bibliography, referring to theoretical papers, studies of innovation and various national and international policy reports.

#### **Objectives, time horizon, relationship to EU Action Plan:**

The Commission proposes that companies investing in certain types of R&D projects should get 25 per cent of the expenses covered by the state, up to a limit of NOK 4 million (EUR 484,000) or 8 million for projects involving universities, colleges and certain R&D institutes. The Commission's majority says this should be given as a tax credit, the minority as direct financial support. This policy measure should come in addition to already existing schemes of support.

The number of doctorate recruits should be increased substantially in the sector of higher education in order to support the demand for new researchers. The Commission underlines the need for investments in new scientific equipment in this sector.

Moreover, the Commission suggests increasing the public investments in R&D programmes targeting the business enterprise sector by 500 million kroner (EUR 60 million). There also ought to be an increase in strategic university programmes for basic science, and in SND's high-risk loans.

An online Norwegian version of the report can be found at <http://odin.dep.no/nhd/norsk/publ/utredninger/NOU/024001-020004/index-dok000-b-n-a.html>

### ***The Mjøs Commission***

#### **Name:**

NOU 2000:14 *Frihet med ansvar - Om høgre utdanning i Norge* (Freedom and responsibility – on higher education and research in Norway).

#### **Published:**

A print version has been published by Statens forvaltningstjeneste (July 2000). An online Norwegian version can be found at <http://odin.dep.no/kuf/norsk/publ/utredninger/NOU/014001-020004/index-dok000-b-n-a.html>

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#### **Produced by/primary agency responsible:**

The report was commissioned by the Ministry of Education, Research and Church Affairs, and produced by a Commission led by professor Ole Danbolt Mjøs. The report was presented to the Minister on May 8 2000.

#### **Presentation of Analysis - main national strengths/weaknesses, problems addressed**

The basic premise of the report is that there is a need for reform in the sector of higher education, partly caused by internationalisation, new private institutions, ICT and new teaching and learning methods. The Commission claims that there is a need for a reorganisation of the various state institutions, and a change in the ways of governing them.

It should be noted, however, that the Commission is split in its analysis of the present day situation. A majority means that there is a need for radical reforms, if the institutions are to supply the learning environment needed and required by the student of today. A minority argues that the present structure and management only need smaller adjustments in order to meet the needs of present day society.

The Commission's analysis goes beyond the needs of business enterprises, and looks at the role the universities and colleges have in connection with the development of Norwegian welfare and culture.

#### **Indicators - figures used, sources and benchmarks**

The report is nearly 700 pages long and contains detailed analyses of the Norwegian knowledge system, the role of universities and colleges in society, culture and the economy,

higher education in an international perspective, the role of ICT, the quality of the learning environment, the role of research, the degree structure, evaluation and accreditation and much more.

The Commission commissioned its own studies of the Norwegian system of higher education, it has made several trips abroad, studying for instance institutions in Finland, the United Kingdom and the United States, and it has made extensive use of international reports on learning, higher education and research.

### **Objectives, time horizon, relationship to EU Action Plan.**

The Commission wants to give the state universities and colleges a more independent role. The majority in the Commission wants to organise them as independent legal entities fully owned by the state. Today they are an integrated part of the state administration. A reform along these lines would mean that the Ministry of Education and Research no longer could instruct the management of the institutions directly, but would normally have to go through the board of the institutions.

Today most of these boards are elected by the faculty and employees. According to the Mjøse Commission the board members should be appointed by the state. The board is to hire the President or Principal (*Rektor*), taking suggestions from the faculty and staff into consideration. Today the faculty and staff elect the President.

An independent institution should, according to the Commission, be given the authority to accredit and evaluate institutions. Colleges that want to become universities or university colleges must fulfil rather strict requirements, but a change of status should be possible. The new Centre for Accreditation and Evaluation is to decide whether they meet the standards of the relevant category: colleges, university colleges or universities. The same applies to private institutions that receive public support.

The Commission emphasises that the goal of reaching the OECD-average as regards national R&D investments (see above) must be the first step towards a higher goal: Norway should invest as much in R&D as its Nordic neighbours: Sweden, Finland and Denmark. The public support to basic science must be increased considerably and the Fund for Research and Innovation should be increased to the size of 20 billion kroner (compared to the existing 4 billion).

The Commission proposes a new degree system in Norwegian higher education – one more similar to the Anglo-Saxon model. In the present system studies leading up to a higher degree (*hovedfag*) may take six or more years. The new master degree should take no more than 5 years, including a bachelor degree lasting 3 or 3,5 years. One should, according to the Commission, implement the new system in as many disciplines and professions as possible.

The public support to the state owned universities and colleges should be divided in two parts: one for research and development, another for education. The size of the support for educational purposes should partly be based on the number of students that finish a particular course or education, partly based on a voucher system where some funds “follow” the individual student. The grants to R&D is to be decided on the basis of the number of students, quality and results, regional consideration and the national need for knowledge and competence in particular disciplines and fields.



## Annex 6: TREND CHART Priorities

### Priority areas and sub-areas

<b>I. Fostering an Innovation Culture</b>	<b>NO</b>
I.1. Education and initial and further training	4
I.2. Mobility of students, research workers and teachers	1
I.3. Raising the awareness of the larger public and involving those concerned	2
I.4. Fostering innovative organisational and management practices in enterprises	3
I.5. Public authorities and support to innovation policy-makers	2
I.6. Promotion of clustering and co-operation for innovation	4
<b>II. Establishing a Framework conducive to Innovation</b>	
II.1. Competition	1
II.2.* Protection of intellectual and industrial property	1
II.3 Administrative simplification	2
II.4. Amelioration of legal and regulatory environments	2
II.5.* Innovation financing	4
II.6. Taxation	2
<b>III. Gearing Research to Innovation</b>	
III.1. Strategic vision of research and development	3
III.2. Strengthening research carried out by companies	2
III.3.* Start-up of technology-based companies	2
III.4.* Intensified co-operation between research, universities and companies	2
III.5. Strengthening the ability of companies, particularly SMEs, to absorb technologies and know-how	3
<b>Total points</b>	<b>40</b>

(\*- measures in these categories relate largely to the four focus/priority areas of IPR, Innovation Financing, Creation of NTBFs, and research-industry technology transfer.)

## Explanatory Notes

It is recognised that, as with any classification scheme, the following is far from perfect. However, although there will be some exceptions, the following notes should assist in allocating measures to one or two sub-themes according to their primary characteristics. Any measures which could be classed as “multi-dimensional innovation packages”, that is, measures that address a number of innovation objectives in terms of their targets and/or modes of action should have this characteristic highlighted in the Template “nature and main goals” section.

<p><b>I. Fostering an Innovation Culture:</b> Promotion of the benefits of innovation. Includes measures stimulating creativity, initiative and enterprise, calculated risk-taking, acceptance of social, geographical and professional mobility; Development of skills, including those dealing with information collection and processing and personal and social communication skills; Developing the ability to anticipate needs and improve organisational capabilities; Improving awareness dissemination and strengthening co-operation to transfer skills and experiences.</p>	
I.1	Specifically this deals with education and initial and further training in the context of skills acquisition which may be relevant to enhancing the innovative capability of individuals, including technical training, vocational studies, etc. Broadly, it includes actions which “concentrate on imparting the skills that are needed to produce and implement innovation”. Lifelong learning should be included as should the acquisition of “a basic educational grounding which is essential to facilitate ongoing adaptation to the new skills that innovation requires”. Distance learning and multimedia should not be neglected. However, all activities in this category are external to the firm environment. Measures affecting the innovative capacity of firms are dealt with under I.4
I.2	This covers the mobility of students, research workers, engineers or scientists from one country or industrial sector to another, and from education or research to industry, which has the effect of encouraging the transfer of technology and the dissemination of know-how.
I.3	Innovation can develop and spread only if it is accepted by society. Actions here reflect the stimulation of public awareness and acceptance of science and technology, the stimulation of consumer demand for technological novelty, innovation in forms of social organisation and communication, and measures which affect the attitudes, values and positions of the social groups involved towards aspects of innovation.
I.4	This is, of necessity, a broad category. Innovation is primarily the responsibility of enterprises, and managing change is one of the main challenges with which they have to cope. Actions under this category range from promoting the ability of enterprises to: keep abreast of changes in markets and techniques and the related methods of design, production and organisation; stimulate the absorption of new techniques and know-how; modernise their structure and organisation, and reshape methods, roles and responsibilities; develop technological, economic and business “watch” capabilities; develop their human capital (training within the firm); and adopt benchmarking and the spread of “best practice” (both technical and managerial). It also includes the provision of technical, commercial and managerial advisory services.
I.5	Includes measures aimed at informing and raising the awareness of the importance of innovation and technology to politicians, senior officials, regional authorities, project and fund managers; improving performance and spreading innovation in the public sector and in government; promoting more active competition in the case of public invitations to tender; monitoring and analysis of innovation processes, results and impacts at the socio-economic level; comparative studies of innovation systems, policies and infrastructure. Actions encouraging the exchange of information and experience among the Member States and those stimulating the development of harmonised statistical information systems, including regular surveys on innovation in industry, services and SMEs, are also covered.
I.6	Actions dealing with intra-sectoral co-operation and collaboration. Includes aspects of promoting the dissemination of best practice, “cluster” and network development, measures facilitating the activities of trade organisations, development of sectoral information databases, etc.

<p><b>II. Establishing a Framework conducive to Innovation:</b> Permitting innovation to flourish and grow. Allowing co-operation to operate correctly; the effective and economical protection of intellectual property; reducing the burdens to enterprises whilst maintaining consumer safeguards; allowing access to funding and easing financial constraints to innovation.</p>	
II.1	Involves measures designed to stimulate competition - one of the driving forces behind innovation. Measures covered include those designed to combat monopolies and to open and liberalise markets and those aimed at the deregulation of protected or compartmentalised sectors. Also covers measures which ensure transfer of technology and the exploitation of patents without undue distortion of competition; and harmonisation of the treatment of joint enterprises.
II.2	Covers harmonisation of intellectual property protection systems; reducing complexity and costs associated with patenting and the maintenance of patents; hastening the formulation and adoption of standardised patent criteria and rules of legal protection; exchange of IP best practice; dissemination of awareness and information on IP protection and patents; support for legal costs of cases of patent infringement.
II.3	Excessive bureaucratisation and administrative overheads are recognised as potential barriers to innovation. This category covers measures designed to streamline administrative practices and may include the provision of on-line application processes, specialised help-line or advisory services, "one-stop shops", simplification or transparency of eligibility conditions, simplified payment procedures, streamlined tendering procedures, etc.
II.4	This includes a broad range of measures including: modifications to Company Law; adoption and amendment of regulations and standards; promotion of performance standards and voluntary agreements; promotion of standards awareness and dissemination of information; harmonisation and streamlining of the legal environment; lifting of restrictions on the creation of new types of businesses and enterprises. Could also cover measures on the impact of legal and regulatory frameworks on innovation performance.
II.5	Provision of finance for innovation activities. Includes measures designed to deliver, or stimulate the delivery, of financial support for innovation, including: mobilisation of private capital, equity finance, venture and risk capital; promotion of investment into RTD; creation of guarantee mechanisms; operation of stock markets, especially for growth enterprises; dissemination of information; development of specialist training; provision of advice; schemes to disseminate best practice and experience.
II.6	Covers all aspects of the fiscal treatment of innovation, not only direct measures such as R&D tax credits but also indirect taxes, social security measures, etc.
<p><b>III. Gearing Research to Innovation:</b> Improving the way in which the fruits of research are transformed into products, processes, services and, hence, contribute to competitive advantage and societal good. Includes strategic planning of innovation policies, support for the RTD process, identification of spin-offs and creation of new innovating firms, and stimulation of co-operation between the public, private and education sectors</p>	
III.1	Covers initiatives aimed at developing long-term strategic approaches to research and its applications, particularly those targeted more closely at growth sectors of the market (including services) and at relevant gaps in national markets. Examples include initiatives such as "Foresight", "Key Technologies" and "Delphi". Similar measures which foster broad-based discussion of potential technology options, generate industry/research/public-sector/training/financing and other networks and initiate interdisciplinary and inter-sectoral thinking are also covered.
III.2	Broadly involves measures designed to encourage and strengthen the performance of research within industry. This might involve schemes which involve: the participation of industry in the definition of national research projects; increasing the contract activities of universities and research institutes for industry customers; promoting industry participation in collaborative schemes such as EUREKA; direct and indirect institutional mechanisms.
III.3	Actions for encouraging researchers and engineers to start up technology-based companies, within universities ("incubators" and "campus companies"), science parks or as spin-offs from larger firms. This will also embody aspects of measures for facilitating the spread of such practice (covering IPR, social rights, financial arrangements, administrative and legal simplification, etc.) and promotion schemes. Actions could also deal with the dissemination of best practice through pilot projects involving, for example, university technology-transfer departments and, the regional institutions concerned (e.g. local authorities, chambers of commerce), risk capital companies and technology brokers.
III.4	Includes actions which aim to promote the dissemination of knowledge between research institutions, universities and companies. This may cover the development of closer links between research and training (anticipating the needs of the productive sector); facilitating university company start-ups, legal and contractual arrangements between universities and

	public research organisations for the exploitation of results with industry; demonstrator projects; co-financing schemes and awards for academic/industrial research co-operation; stimulation of dialogue between the producers and users of technology (such as sectoral and inter-sectoral forums, technology clubs, etc.); creation and growth of science and technology parks, etc.
III.5	This category may be distinguished from I.4 above in that it deals specifically with those measures which aim to improve the ability of SMEs to undertake innovation activities, particularly those at the research end of the innovation continuum. Such measures would include those designed to improve firms' access to new technologies, new techniques, etc. Examples could include direct R&D grants, collaborative schemes and training in research.