STI OUTLOOK 2002- COUNTRY RESPONSE TO POLICY QUESTIONNAIRE

NORWAY

1. General framework and trends in science, technology, and industry policy

1.1. Overview and assessment of policies for science, technology, and industry

The parliamentary election in October 2001 led to the resignation of the labour government, and the installing of a government based on a conservative three-party-coalition. Both the 2002 state budget presented by the new government and public statements indicate a clearer emphasis on the relevance of general framework condition policy instruments, such as taxation and labour policy matters rather than more specific industry policy instruments.

Based on the White Paper on research, *Research at the beginning of a new era* (St.meld. nr. 39 (1998-1999)), and the subsequent parliamentary debate in February 2000, there is general political agreement that research and development (R&D) is a national priority, and that investment in research should be substantially increased in the years to come. It is a national objective that the level of R&D funding shall at least reach the OECD average by 2005, measured as a proportion of GDP.

Accompanying the Revised National Budget of 2001 (St. prp. nr. 84 2000-2001)[1], the previous government presented an "Escalation Plan" where the growth in R&D funding was put in more concrete terms. In order to reach the OECD average, the plan says, Norway will have to invest some BNOK 10 in the period between 2001 and 2005. It is estimated that about 40 per cent of the growth will have to come from an increase in public funding. The growth in public funding is to come through the National Budget, partly through the yield of the Fund for Research and Innovation.

The possibility of reaching the goal of the OECD average rests on the condition that industry takes its share of the increasing R&D investments. In order to develop policy measures aimed at encouraging industry to invest more in R&D, the Government appointed the Hervik commission. The commission submitted its report in March 2000. On the basis of this report, the Government has introduced a general tax deduction scheme for R&D expenditures from 1 January 2002. Aimed at SMEs in particular, the scheme will include R&D performed within companies as well as purchase of R&D services from both Norwegian and foreign research institutions.

A major reform of universities and colleges is in the process of implementation. The reform – originating in the report from the Mjøs commission and a White Paper on higher education – includes a new funding system and a legislative, administrative and organisational revision. The main trend is to give institutions

[1] "The Revised National Budget" cp. St.meld. nr. 2 2000-2001 *Revidert nasjonalbudsjett for 2001* and St.prp. nr.84 2000-2001 *Tilleggsbevilgninger og omprioriteringer i statsbudsjettet medregnet folketrygden 2001* http://odin.dep.no/fin/rnb2001/ In Norwegian.

more academic and economic freedom, with expanded possibilities for institutional profiling, greater flexibility in personnel management and a strengthened leadership. At the same time, it is considered necessary that institutions should strengthen their interaction with society. New measures, aiming at a more active part for institutions in patenting and commercial exploitation of R&D results, are under way. (Cf. 2.2 and 4.2).

1.2. Features and changes in the nature and process of policy evaluation

Both the last White Paper on research and the more recent White Paper on higher education stress the importance of quality in the knowledge system. Evaluations of special research fields and institutions give important information for policymakers and the institutions themselves on how to improve quality. Evaluations are frequently used as key instruments to ensure that publicly funded R&D are of high quality.

In connection with the parliamentary debate on the White Paper on higher education in 2001, the Norwegian parliament asked the government to establish an independent agency for accreditation and evaluation. The Ministry of Education and Research is planning to put a proposal to Parliament in 2002.

The agency will be given mandate to accredit institutions and their programs. Accreditation means that the agency should undertake an assessment of both the institutions themselves and the studies offered. As a first step, the agency will accredit universities and colleges owned by the state only, but the next step will be to include accreditation of private institutions of higher education. During this initial stage the institutions owned by the state will not have to undertake an evaluation to get accreditation, but the agency will be given the mandate to withdraw accreditation later on if the institutions do not fill the set requirements.

In March 2000, the Norwegian government appointed an official committee with the task of exploring the methodological basis for benchmarking, and of establishing a system of benchmarks for the evaluation of Norwegian industry's business environment. The committee has performed a methodologically thorough analysis, and presented its report to the public in November 2001.[2]

The Research Council of Norway, RCN, was established in 1993, when Norway's existing five research councils were merged into one single council. A major evaluation of the results of the 1993 structural reorganisation - prepared by an international team of evaluation specialists and supported by a senior panel of scientists and leaders of research institutions - was completed in December 2001.

The evaluation analyses the connection between the RCN's framework conditions, organisation and instruments, and the objectives laid down for its activities. The assessments of the evaluation are empirically grounded among other things in the experiences of central groups of actors in the Ministries, research institutions, the commercial sector and the RCN itself. In the light of the analysis, the evaluation also considers how the RCN ought to meet future challenges confronting Norwegian research.

The evaluation regards the creation of the RCN as a big and exciting experiment that should be given the chance to develop further. However, the evaluation states that the structure of the Research Council must be better adapted to its mission. Changes in the framework conditions are seen as a requirement for continuation of its work. The evaluation is to serve as a basis for subsequent political debate on the future of RCN in 2002.

[2] The report can be downloaded in Norwegian http://www.dep.no/nhd/norsk/publ/utredninger/NOU/024001-020006/index-dok000-b-n-a.html

The main evaluation report and the 16 background reports can be downloaded at: http://www.technopolis-group.com/reports/index.htm

For general information about the RCN: http://www.forskningsradet.no/english/

2. Public sector research and public research organisations

2.1. Policy changes and background/rationale related to public sector R&D

In the latest White Paper on research, the Government signalled that growth in public R&D funding shall mainly be directed to strengthening long–term, basic research in general and research within four **areas**:

- Marine research.
- Information and communication technology (ICT).
- Medical and health care research.
- Research in the interface between energy and the environment.

The priorities are being followed up in the national budgets. As mentioned in section 1, the growth in public funding is to come partly through the yield of the Fund for Research and Innovation. The Fund's capital has been substantially increased in the last couple of years and the capital now amounts to BNOK 13. The yield is applied to the strengthening of long-term, basic research in general and research within the four thematic priorities, as well as to new measures to improve the quality of Norwegian research. In 2001 the yield from the fund was MNOK 204. This will increase to MNOK 525 in 2002. The RCN has until 2002 distributed the yield from the Fund on the overall guidelines set by the Government and the Parliament (the Storting). In 2002, one third of the yield (MNOK 175) will be channelled directly to higher education institutions, whereas two thirds (MNOK 350) will be channelled via the RCN.

In January 2001 the Government received a plan (FUGE) from a national committee with broad representation from Norwegian research institutions on the need to substantially increase Norwegian allocations to research in functional genomics. The FUGE initiative from the research institutions was taken into account in the 2002 National Budget by earmarking NOK 100 mill. of the yield from the Fund for Research and Innovation to establish a project administered by the RCN. The FUGE scheme is seen as a multidisciplinary initiative well fitted to the prioritised research areas within Norwegian research policy.

(For information about the FUGE plan in English:
http://www.forskningsradet.no/bibliotek/publikasjonsdatabase/filer/pub-10031.pdf)

In the 1999 White Paper on research mentioned earlier, it was proposed that Centres of Excellence (CoE) should be established as a means of raising the quality of Norwegian research. Based on this document and a feasibility study made by the Research Council, the Ministry of Education and Research endorsed a Norwegian CoE scheme in January 2001. The intention is to bring more researchers and research groups up to a high international standard. The scheme, which is administered by the Research Council, will be implemented gradually, beginning in 2001. Given a total average budgetary framework of MNOK 10 to 20 per centre per year, it should be possible to establish 5 to 10 centres initially and to double that number over a two year escalation period.

Host institutions, which may be universities or colleges, research institutes or business/industrial enterprises, will be expected to contribute, mostly in the way of infrastructure, but also by special budgetary allocations. The primary model for the centres is that they shall consist of research groups, located in the same place where possible. Centres should form strong professional networks. The main criterion will be a high level of scientific quality, as judged by international standards. International experts will judge applications in two phases, and the first prequalification phase is now completed. The first centres will be established in 2002.

(Information in English about the Norwegian CoE scheme can be downloaded from: http://www.forskningsradet.no/fag/andre/sff/english.html)

2.2. Initiatives to reform the organisation and governance of universities and public research organisations

For a description of the recent White Paper on higher education, *Do your duty – Demand your rights* (St.meld. nr. 27 – (2000-2001)), see the Norwegian response to the Ad Hoc Working Group on Steering and Funding of Research Institutions. The new government has decided that institutions shall have a high degree of autonomy in deciding their own form of organisation. This means that they can also choose to become independent state-owned legal entities. The Ministry of Education and Research is currently working on the implementation of the reform, especially with regard to changes in legislation, and is planning a proposal to Parliament in 2002.

(For information about the White Paper on higher education: http://www.dep.no/ufd/eng/publ/veiledninger/)

3. Government support for private-sector R&D and innovation

3.1. Changes to enhance the effectiveness of policy instruments used to provide public support for private sector R&D and innovation

Tax treatment of business R&D

The new Government will for 2002, as mentioned under section 1, establish a general tax deduction scheme, including both firms purchase of R&D-services and internal R&D.

Foreign companies who pay taxes to Norway can also be included. The scheme is limited to companies that fulfil two of the following three criteria:

- Less than MNOK 80 in sales revenues.
- Less than MNOK 40 in balance sheet total.
- Less than 100 employees.

Companies that fulfil the criteria can get a 20 per cent tax allowance on their R&D expenses.

In order to increase user-financed R&D in Norwegian fisheries and fish farming industries, the Government introduced a new levy on the export value of fish and fish produce in 2001. R&D-funding

financed through this levy will give priority to projects initiated by the fisheries and fish farming industries themselves. An expansion of an already existing user-financed arrangement designed to meet R&D demand in forestry, agriculture and agricultural industries has also been introduced.

Direct public funding of business R&D and innovation (e.g. grants, contracts, loans, etc.).

The major Norwegian funding instruments of business R&D during the last decade have been User-Oriented Industrial R&D support scheme (UOR) – run by the Research Council.

The private sector finances approx. 2/3 of R&D cost in this scheme, bringing total R&D investments to around BNOK 2 or 10% of total Norwegian R&D-investments.

The UOR scheme has its roots as far back as the 1960s but was turned into a major R&D policy instrument around 1990. The rationale behind the scheme was primarily to ensure that the publicly supported R&D institutes worked in line with industrial priorities. During the 1990s the allocations have decreased in real terms to around half the level at the start of the decade.

In the 2002 National Budget allocations to the UOR-scheme are reduced by about MNOK 200 due to the introduction of the new tax incentive scheme.

From 2000 on, the UOR scheme comprises a new instrument called 'Strategic R&D projects with User Involvement' (KMB). KMB is long-term, basic, strategic research arranged to build competence in the R&D system that is useful for industry. Applicants are R&D institutes with secured industrial financing in cash of minimum 20%.

Public procurement policies, new contractual guidelines, more competitive selection processes, etc.

Existing international agreements, including the European Economic Area (EEA)-agreement and the WTO agreement on public procurement have been implemented in the Norwegian legal system and regulations. To stimulate R&D and innovation in connection with public procurement, the Public R&D Contract Scheme (OFU) (run by the Industrial and Regional Development Fund, SND) was introduced in 1980. The scheme has experienced some variation of funding during recent years.

3.2. Changes in the balance and/or priority of public support of business R&D and innovation

Increased emphasis on specific technological/industrial sectors, such as ICT, biotechnology, and knowledge-intensive services.

Cf. 2.1

Programmes to support R&D and innovation in SMEs

The most important program to support R&D in SMEs, was the introduction of the FUNN-scheme. FUNN has been replaced by the general tax deduction scheme limited to firms with less than 100 employees. The MOBI Programme is also an important SME-related programme (cf 4.1).

4. Enhancing collaboration and networking among innovating organisations

4.1 Initiatives to promote collaboration and networking among innovating organisations

Initiatives to strengthen regional/local innovation systems (i.e. innovative clusters).

The MOBI Programme is a new R&D-programme under the auspices of the Industry and Energy Division of the RCN. The programme is based on the BRIDGE Programme (Programme for Bridging the Gap between Industry and Research, 1996-2000/2001).

(For information about the Industry and Energy Division: http://www.forskningsradet.no/omnfr/forsk/brosjyrer/ie_engelsk.pdf)

The concept underlying the MOBI Programme is to ensure that more enterprises with limited R&D experience, usually SMEs, are offered long-term assistance to enhance their ability to innovate in collaboration with various R&D institutes and other relevant players. MOBI activities operate at regional level, and one important aspect is to promote better functioning regional innovation systems. MOBI emphasises collaboration with relevant user-driven R&D innovation programmes and other public sector instruments, especially those under the auspices of SND. The programme operates in the interface between R&D and corporate development, technological and economic-administrative processes. The programme portfolio consists of several sub-programmes, some of which are aimed at supporting SMEs.[3]

Efforts to boost collaborative research through public/private partnerships in R&D.

In the ICT-Fornebu Project, public and private interests are co-operating in new ways, aiming at developing a major R&D ICT-centre. The aim is to establish close ties between higher education institutions and ICT-oriented businesses in this new cluster in the Oslo Region with national and international links.

The DEMO 2000 programme is aimed at developing new oil and gas fields on the Norwegian Continental Shelf through new technology, increased security of execution within budget and planning and new industry products for the international market. Apart from public funding, the program will receive funds from relevant companies and institutions.

4.2. Initiatives to promote stronger industry-science relations

The Bernt Commission on commercial exploitation of R&D results from university and college research

A commission chaired by Professor Jan Fridthjof Bernt of the University of Bergen submitted its report on patenting and commercial exploitation of results from university and college research in March 2001 (NOU 2001:11 *Fra innsikt til industri* — "From insight to industry").[4] The commission was set up to

[3] Some of the programs are briefly mentioned in the questionnaire to the CSTP working group Steering and Funding of Research Institutions, Section C, question 4)

[4] The report can be downloaded in Norwegian at http://odin.dep.no/ufd/norsk/publ/utredninger/NOU/014001-020005/index-dok000

consider possible amendments to statute law or regulations, or other measures contributing to a strengthened effort on the part of the institutions themselves. The commission concludes that commercial exploitation should be considered an integrated part of the institutions' duty to disseminate knowledge and can be strengthened by the use of various incentives, practical organisational changes and information on the importance of such activities. The commission argues that the institutions should develop relevant strategies and establish "innovation centres" with professional advisers, internally or externally.

As to legislative measures, the commission is divided. The majority believes that the researcher ought to retain the full property rights of an invention (as it is today). These members argue that this is preferable in order to defend the freedom of scientific research. A minority would like to transfer this right to the institution. These members argue that the institution needs this right in order to promote commercialisation in an efficient way. The whole commission says that the income following from such commercialisation should be split between the researcher, the institution and the research units.

The report has been circulated for public comment and the Ministry of Education and Research is currently considering its proposals with a view to presenting a proposal to Parliament in 2002.

5. S&T human resources

5.1. Policy initiatives in response to real or perceived shortages of scientists and engineers

A general decrease in the recruitment to natural science has been observed, and a shortage of ICT educated personnel has been registered earlier.

The organised education of doctoral students has been evaluated. A White Paper on recruitment to education and research in universities and colleges will be presented to Parliament in the spring 2002.

5.2. Changes in training and education programmes for scientists and engineers

Great importance is attached to raising public awareness of science. One example is the co-ordinated effort made by universities, colleges and the RCN each autumn to present research to the public. The RCN has also opened an interactive site on the Internet for communication of research results to groups outside the research community, journalists, teachers and pupils among others.

A three-year project (RENATE) has been established in order to increase the recruitment of students to natural science and technological subjects.

An annual international prize in mathematics has been established in the name of the Norwegian mathematician Niels Henrik Abel, with the aim to increase public interest in the subject. The prize will be awarded for the first time in 2003.

National policy emphasises the importance of recruiting more women to science and technology. At university level some institutions have established measures to attract more women to studying informatics. A project in primary and secondary school aiming at making girls interested in mathematics

(Operation Minerva) illustrates the intention of looking at the whole education system when considering what can be done to improve the situation.

5.3. Policy changes related to the international migration and mobility of S&T personnel

Several recent political initiatives have addressed the problem of how to attract highly qualified persons to the Norwegian labour market from abroad. In order to increase the availability and quality of labour with research competence, the Hervik commission proposed measures to attract foreign researchers. An interministerial working group has also delivered a report on recruitment of labour from abroad. The working group proposed to make the "specialist clause" of the Immigration regulations less restrictive. New immigration regulations were made effective in 2000. An institution wanting to employ a foreign specialist no longer has to prove an "absolute need".

Norwegian legal framework contains a "quarantine clause", requiring a quarantine of five years after graduation from higher education institutions before foreigners who have received financial benefits from Norwegian authorities can demand a permit to stay and work in Norway. The "quarantine clause" in the Immigration regulations has been made less restrictive. The new clause provides a possibility — not a right — to apply for a derogation from the rule.

The White Paper on higher education states that it is a goal that all higher education institutions shall offer students a period abroad as a component of the Norwegian degree course. A working group in the Ministry of Education and Research is currently in the process of proposing measures on how to increase mobility among Norwegian students and researchers, and how to attract foreign students and researchers. The group will deliver its report in the first half of 2002.

6. International co-operation and globalisation

6.1. Initiatives to promote international co-operation in science, technology and innovation

Measures to enhance access of foreign firms to domestic technology programmes and to enhance access of domestic firms to foreign/international technology programmes.

The User-Oriented Industrial R&D programmes (UOR), run by the Research Council, are in principle open to foreign firms. Norwegian firms are stimulated to participate in foreign R&D-programmes, like the European Framework programmes and Eureka-projects, through public support to pre-projects.

As mentioned in section 1.1, the new tax deduction scheme also applies to purchase of R&D services from foreign research institutions and to foreign companies who pay taxes to Norway.

6.2 Policies and programmes to foster international collaboration in research and development

Norwegian participation in international research co-operation has been significantly extended in recent years. Norway will continue to develop its participation in a number of international joint commitments, where research co-operation with the EU under the EEA Agreements is the most comprehensive. Norway has participated in the EU framework programmes for research since 1987, and supports the development of a European Research Area. Benefits from co-operation with the EU are substantial but ought

nevertheless to be further increased. The same applies to our membership in CERN, EMBL/EMBC, ESRF and IARC.

Norway wishes to strengthen co-operation and contacts between individual researchers and to further international research co-operation on Norwegian soil. Polar research co-operation with Svalbard as the central platform is of particular importance.