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**Trends and Perspectives in the Sector of
Higher Education**

Country Note for Norway

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Preface

This note is prepared by Hans Skoie, Delegate to the OECD's Group on the Science System (GSS) for the Tokyo meeting of the Group, Nov. 1996 according to guidelines from OECD. This version is updated in December 1997 on request from the OECD.

This paper includes information from official documents and statistics. It also includes interpretive passages which are the responsibility of the author and do not necessarily reflect the policies of the Ministry of Education, Research and Church Affairs, nor those of the Norwegian Institute for Studies in Research and Higher Education. We are pleased to make this material available to a broader audience.

Oslo, January 1998

Berit Mørland
Director

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1 Introduction

1.1 The Norwegian System of Universities and Higher Education

The Norwegian university system is comparatively young. Three of the four universities were established after World War II; the sector has expanded tremendous in the post war period, in Norway as in most OECD countries.

In a major reform of higher education in Norway in the early seventies, traditional institutions for teacher training, nursing etc. were upgraded and seen as part and parcel of a system of higher, or tertiary, education. At the same time approximately 15 new junior/community colleges were founded to give short-cycle, vocational education as an alternative to traditional university degree courses. Many staff members with an academic background were recruited to these new institutions, many of which came to emulate the universities rather than the traditional institutions in this sector. This “academic drift” was not intended.

The upgrading of existing schools and the new junior colleges led to a rather heterogeneous college sector comprised of more than 100 institutions. In 1994 a major effort was launched to streamline the sector through mergers; the result being 26 state colleges. However, the mergers did not change the geographical location of the institutions; it was essentially an administrative reform, and considerable heterogeneity still exists in the sector both with regard to content and location.

Thus, the Norwegian system of higher education of today is essentially a binary one with two sectors with roughly the same enrolment: a sector of research-based universities and university colleges and a college sector. However, the two sectors are in many ways not so far apart. An American type of credit system in much of higher education in Norway gives considerable flexibility for studies and credit transfer among institutions. Also in terms of selectivity and prestige, differences between institutions are smaller than in many other countries.

In 1995 the two sectors were linked even closer together by the new Higher Education Act which applies to all higher education. The special character of the universities is stressed, including their special responsibility for research. However, it is somewhat vaguely mentioned that the college sector shall be “research based”. The latter have been interpreted by several college presidents as a responsibility to carry out research at the institutional level in these schools rather than as an actual right for each individual staff member to do research; individual qualifications and responsibilities have to be taken into account. The research component in these schools is in any case likely to be strengthened in the future, according to many spokesmen. “Academic drift” has obviously taken place in

greater parts of the college sector for years - particularly so in the junior/community colleges which were founded in the 1970s.

1.2 Universities and higher education - key figures

In Table 1 we give some key figures for the two sectors of higher education in Norway. We note that the number of students in 1997 is expected to be somewhat higher in the college than the university sector. For the budget figures the situation is the opposite primarily due to more costly studies (e.g. medicine) and the higher expenditure on research in the university sector, longer and more advanced education (e.g. research training) etc. The two right-hand columns give the estimates for research expenditures according to the national R&D statistics.

Table 1: Key figures for the university and college sector respectively in Norway

Sector	No. of institutions	No. of students	Budget (1997) (Ministry) Mill. NOK	R&D** (1995) Total Mill. NOK	External (1995) funding Mill. NOK
University	9*	85,000	7,200	3,800	1,150
College	26	97,000	4,900	300	50
Total	35	182,000***	12,100	4,100	1.200

* Four universities and five university colleges ("wissenschaftliche Hochschulen")

** Source: National R&D statistics, NIFU

*** Including 12,000 students in private institutions.

Source: National R&D statistics (NIFU), Statistics Norway

Table 2: Staff in the university and state college sector respectively, according to position in 1995. Total and percentage of women.

Position	The universities ¹		State colleges	
	Total	Women (%)	Total	Women (%)
Professor	1817	10	87	3
Other tenured positions	2248	28	4879	45
Externally paid	873	33	82	30
Staff paid by hospitals	903	17	-	-
Recruitment personnel	2914	39	89	31
Total	8755	27	5137	44

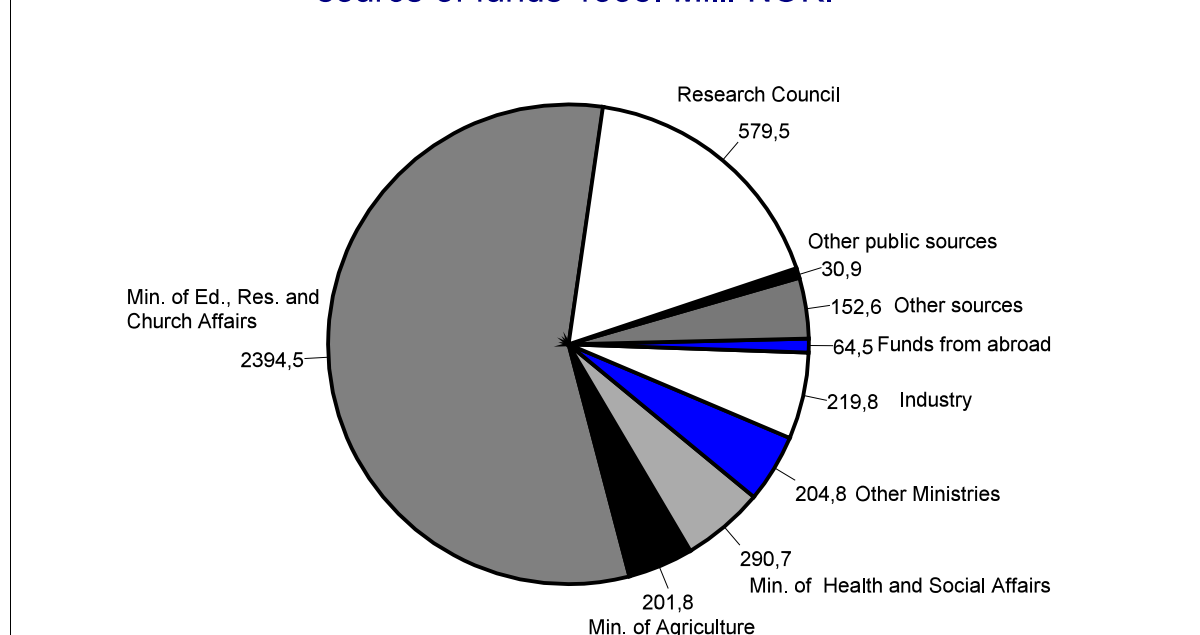
¹ Includes university-level colleges.

Source: NIFU

Table 2 gives figures for full time faculty in universities and colleges respectively, according to academic rank. Most college faculty are not involved in research, and the numbers of professors and fellowship-holders differ greatly between universities and colleges. In the universities, the share of women is largest among fellowship-holders.

In Figure 1 we give a breakdown of the university R&D activities according to source of funds. We observe that the “floor funding” from the Ministry covering most salaries etc. is the dominant source for university research in Norway followed by research council funds. Industry contributes 220 million NOK, i.e. approximately 5 per cent, i.e. essentially contract work. Accordingly, public funding is the dominating source.

Figure 1 Research funding in the Higher Education Sector according to source of funds 1995. Mill. NOK.



1.3 International orientation and cooperation

Stimulating the international dimension of R&D in general and international cooperation in academia in particular has been an important task in Norway for a long time. The country's small size and geographical location also make such a policy more or less imperative.

In the 1980s this policy was purposively intensified. Research staff were strongly encouraged to travel internationally and the country became a member of such collaborative efforts as EMBL, ESA and the EC's Framework Programme through the European Economic Area Agreement. The changes in Eastern Europe also brought opportunities for more intensive cooperation with these countries.

Comparatively speaking, the international mobility of Norwegian research staff is probably higher than in most OECD countries. This may be a consequence of a traditionally rather weak research training in Norway and of relatively generous financial support by the research councils for travel and longer visits to foreign countries, in particular after World War II. It may also be fair to say that the research community by and large has recognized and accepted the value of professional training and experience from good departments and laboratories abroad. In 1959 the Nordic ministers of education recommended that professorships be advertised in all Nordic countries. To some extent, this is in fact done.

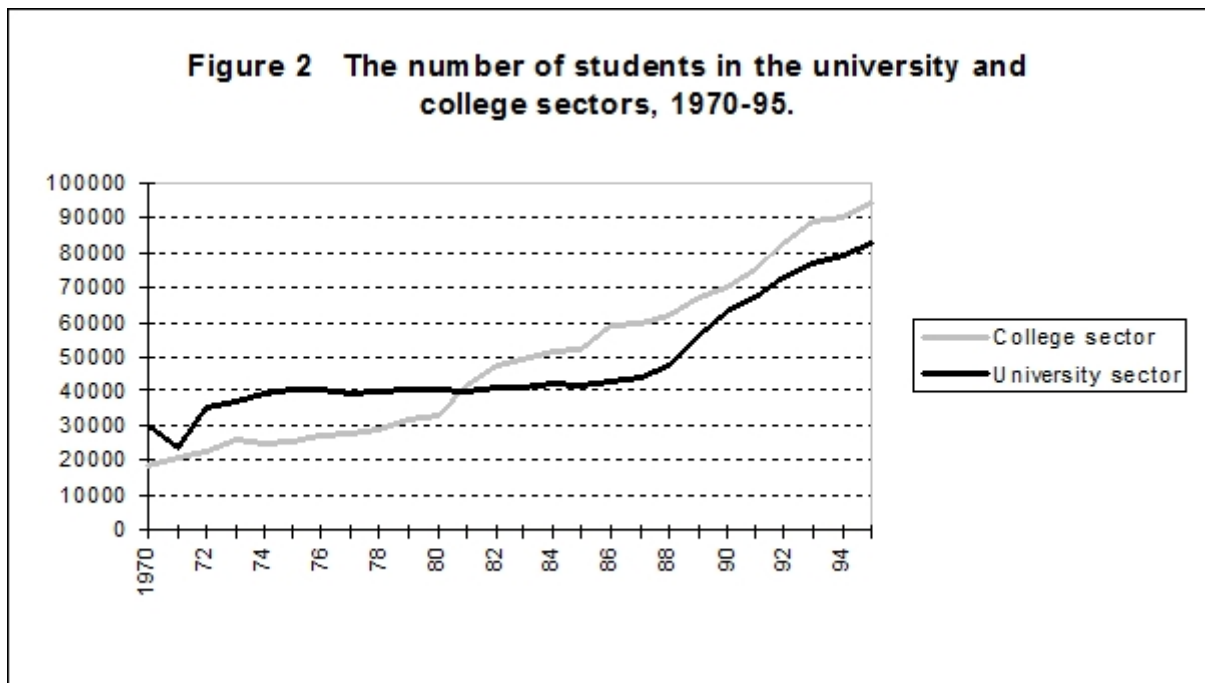
The geographical orientation of personnel mobility has increasingly been Anglo-American, in strong contrast to the situation before World War II when cooperation with the other Nordic countries and Germany in particular was dominant. The Anglo-American

orientation has obviously been strengthened by attractive research training programmes leading to the Ph.D. Furthermore, the effect of the rise of institutional cooperation in Europe in R&D - particularly in basic research - as well as cooperation within the European Union has probably had a significant impact in recent years.

2 Recent trends in politics and budgets

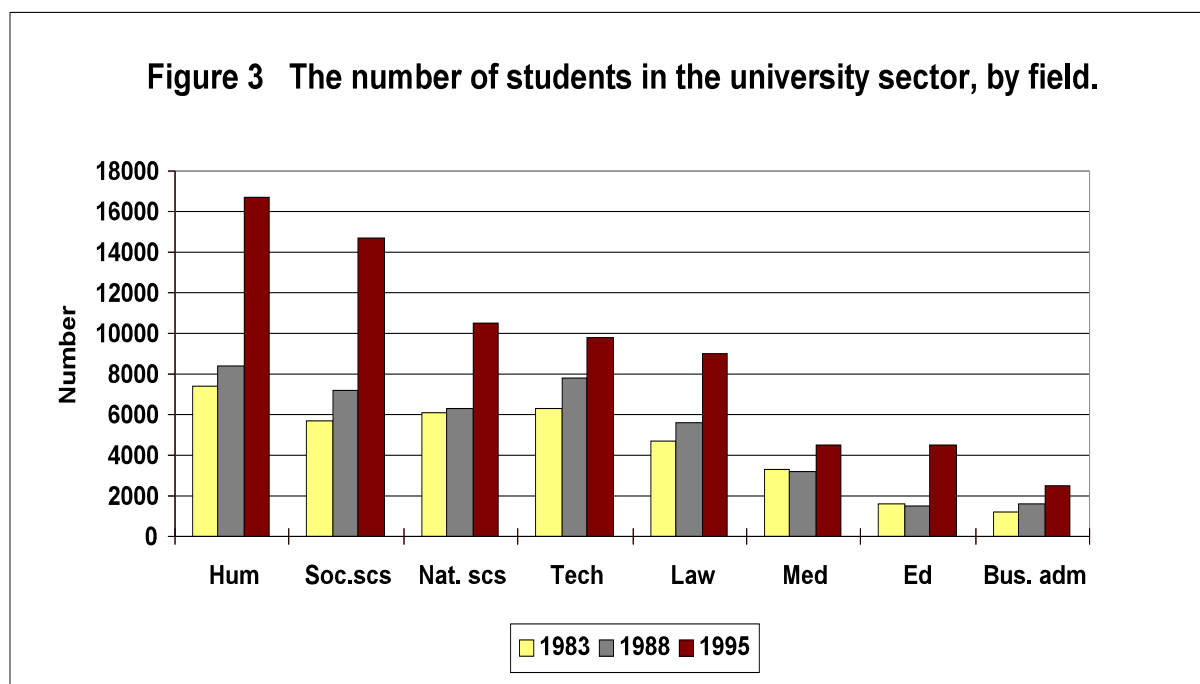
2.1 Student enrolment

Student enrolment in higher education has increased greatly in the post-war period and in the last few years in particular (cf. Figure 1 which shows total student enrolment in universities and colleges). We notice that the college sector, which includes teacher training, nursing and engineering colleges, now has a larger enrolment than the university sector. Both sectors have experienced enormous growth during the last decade.



Source: Statistics Norway

In the university sector we find growth in enrolment numbers in all fields during the 1983-1995 period. The pattern of growth is uneven, however. The strong growth in the humanities and the social sciences recently is particularly noteworthy. Enrolment in engineering and science faculties has also increased (cf. Figure 2 which shows enrolment by field of study in the period 1983-1995). Their share of the total student population has, however, declined.



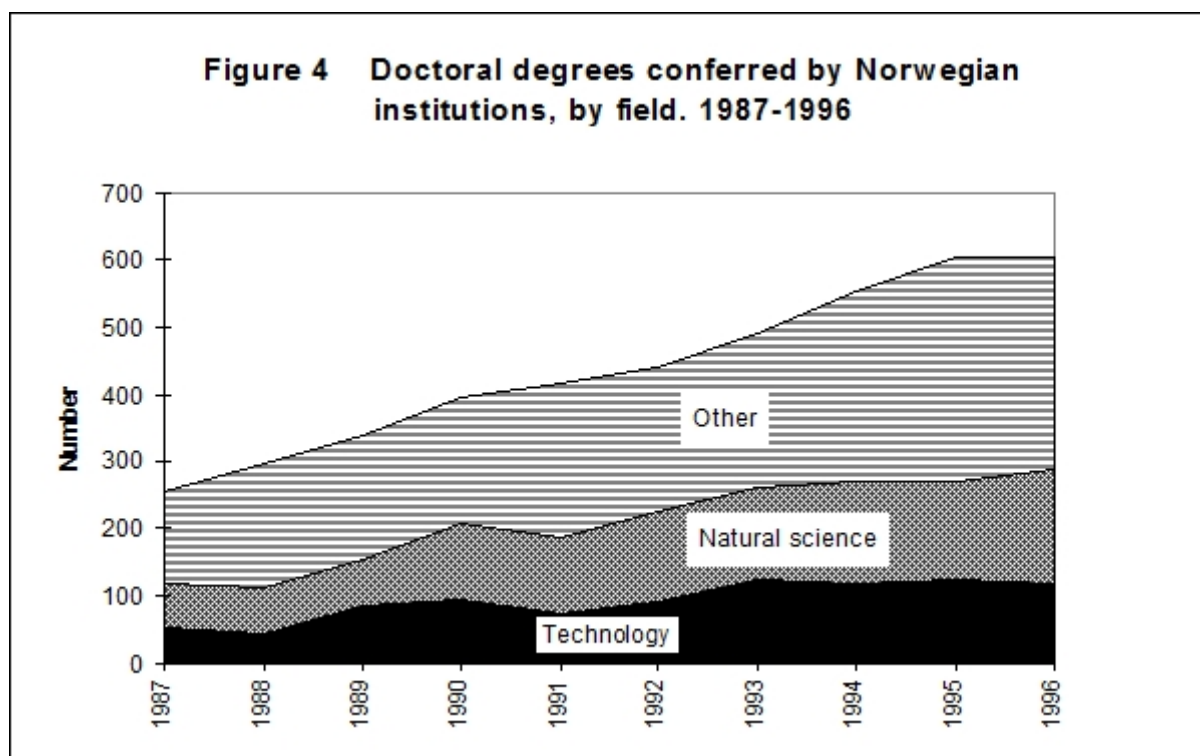
Source: Statistics Norway

When these data are analysed in greater detail, we observe that biological sciences have fared better than the physical sciences at university level.

In the college sector, the three-year **engineering** courses have been less popular the last few years and certain courses have not been able to attract qualified entrants to all available places.

At the postgraduate (MA/MSc) level the **number of graduates** has increased considerably in the 1983-1995 period in all fields. However, the relative shares of graduates among fields have not changed much. This is a consequence of the fact that science and engineering students are more efficient in terms of time to degree and have lower drop-out rates.

The **number of doctorates awarded** has increased considerably in recent years - not least due to more available fellowships and the introduction of a new degree programme somewhat similar to an American Ph.D. Figure 3 below gives a picture of the growth in doctoral degrees conferred in the 1983-1996 period. We notice that the number of doctorates awarded has doubled over the last decade. The share of women recipients has also increased considerably.

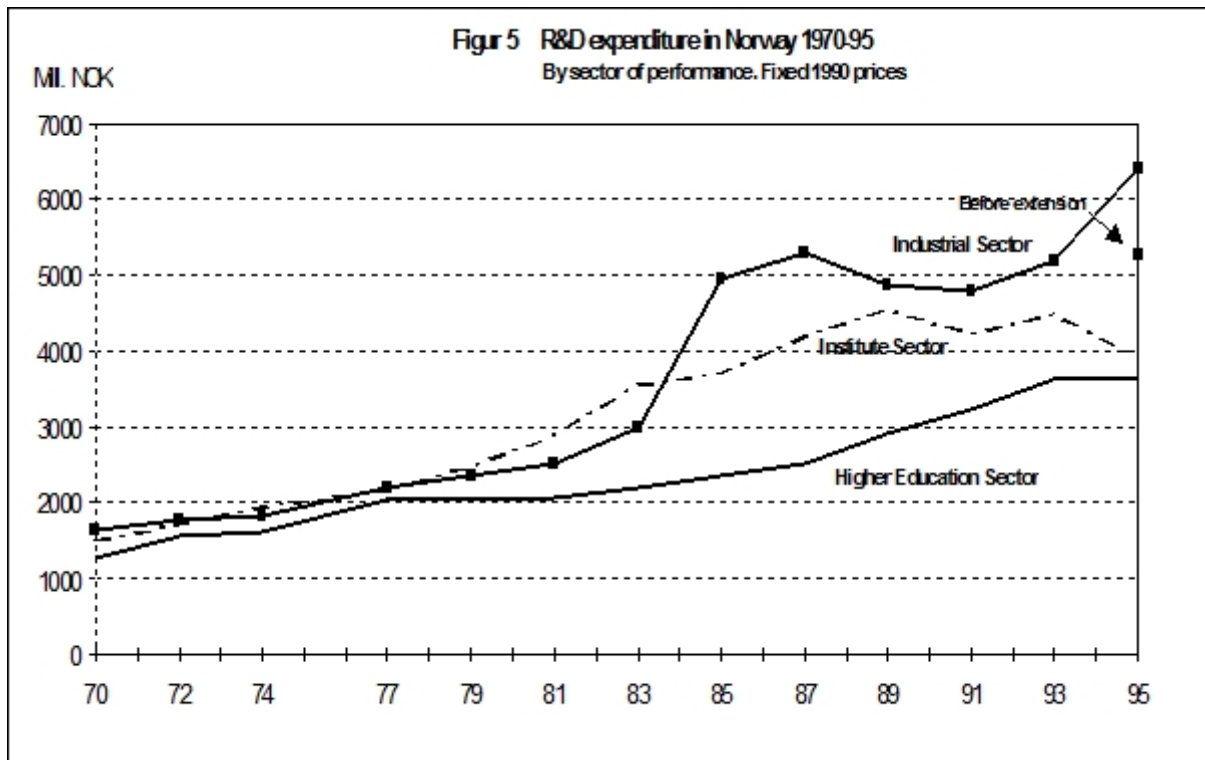


Natural science includes the faculties of natural sciences only, not medicine and veterinary sciences. *Technology* only includes the Norwegian Institute of Technology(Trondheim).

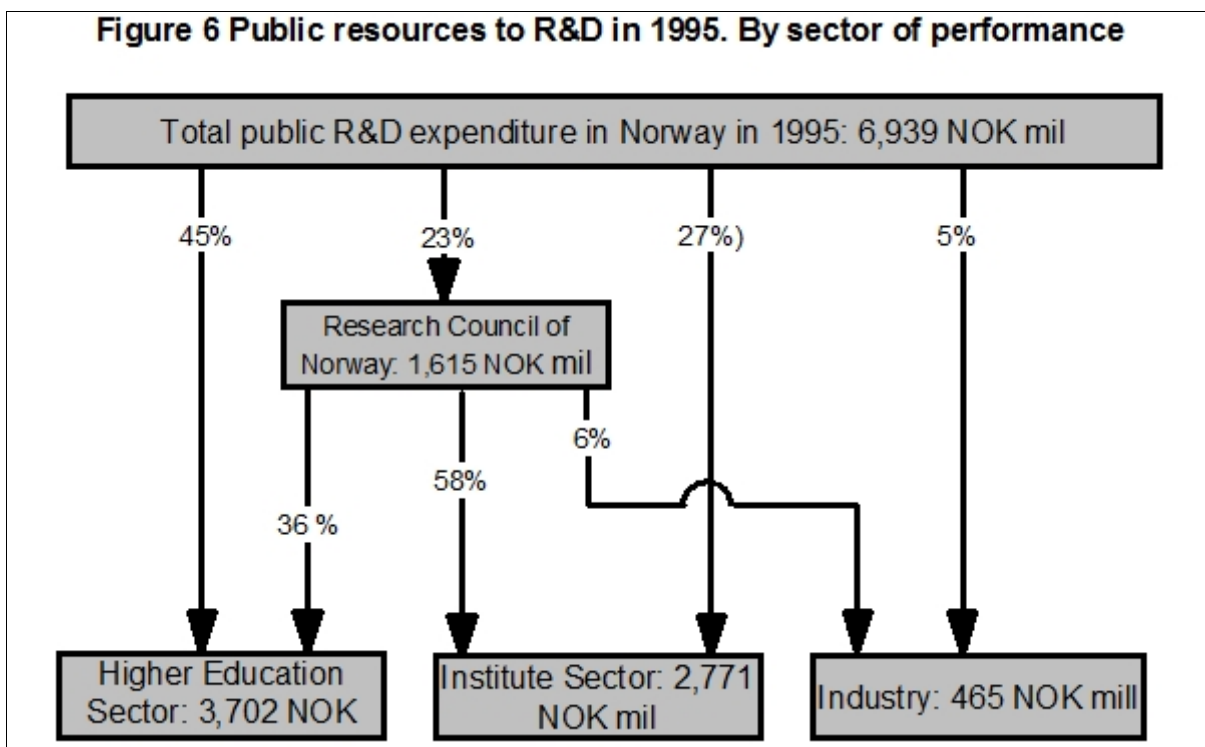
Source: Norwegian Institute for Studies in Research and Higher Education

2.2 R&D expenditures - the overall picture

Figure 5 gives an overall picture of the R&D expenditures in Norway by sector. We note that research expenditures in the universities have been growing substantially in Norway in the last few years, according to the national R&D statistics. The rise in student numbers followed by considerable staff expansion, including fellowships for research training, accounts for much of this development. The statistics may, however, possibly be inflated, as the basic parameters for the estimates are somewhat dated. We also note that R&D performed in Norwegian industry has levelled off - a fact which currently worries many policy makers (and doctoral students who want to find work) in Norway. Figure 6 gives an overall picture of Government R&D funding according to sector in 1995.



Source: Norwegian Institute for Studies in Research and Higher Education/Statistics Norway. The survey of R&D activity in the industry sector was expanded in 1995. The point "Before extension" shows the R&D expenditure in 1995 using the old sample of units.



Source: NIFU/Statistics Norway

Funding of university research and research training

In addition to the “floor funding” coming from the Ministry of Education, Research and Church Affairs, the Norwegian Research Council is the second most important contributor to university research as we have seen in Figure 1. The council is the result of recent major changes in the R&D organization. In the period 1988-1993 Norway has totally changed both its advisory system and its public funding system for R&D. The former research councils - essentially one basic and four applied - have been merged into a single council. The Advisory Council for Science Policy has been abolished and the advisory function included with the tasks of the new council. Furthermore, the new council has been given a role as an umbrella organization for the sizeable sector of government institutes and laboratories.

The merger was in no way obvious given the diverse nature of the former councils. The majority of the councils were applied and mission-oriented: to technology and industry (NTNF), agriculture (NLVF), fishery (NFFR), and applied social science (NORAS). Only the NAVF with its four subcouncils for science, medicine, social science and the humanities was a traditional university-oriented council as part of a dual funding system for the universities. Furthermore, the councils were attached to different ministries.

The dominant research council in terms of funds, the NTNF, has been seen as an important element in government industrial policy through funding of R&D - not least the development part. It could be argued that the NTNF should not be viewed as a research council in the traditional sense. In the other Nordic countries, for example, substantial parts of activities like those of the NTNF were not organized on a research council basis. The new arrangement represents a centralization under the Ministry of Education, Research and Church Affairs and obviously seeks to integrate very different and well-established subcultures and missions. The stated objective of the merger was to make Norwegian R&D organization simpler, more rational and more efficient, and to achieve better integration between basic and applied research.

The new Council is divided into six subunits, each with its own board comprised of researchers as well as users:

- Industry and Energy (including oil, shipping and service industries)
- Bio-production and Processing (i.e. fishery, aquaculture, agriculture, veterinary, medicine, forestry and food industry)
- Environment and Development
- Medicine and Health
- Culture and Society (the humanities, social sciences, public administration and services)
- Natural Sciences and Technology

The council has a nine member board appointed by the Government, while the six research boards are appointed by the council board. It should be noted that in addition to funding from the Ministry of Education, Research and Church Affairs the council also receives regular funding and guidance from several other ministries, notably those for industry, agriculture, fisheries and the environment. Figure 6 above gives a picture of total Government R&D funding in 1995 - including the role of the research council.

Research training in Norway has been rather generously supported through fellowship schemes directly applying government staff regulations, guidelines and pay scale. During the last few years, the training for the doctorate has been brought closer to an American Ph.D. system. The number of fellowships was expanded considerably, on the assumption that the new PhDs are suitable for work also outside academia. In its 1997 budget the Government calls for a more thorough analysis of the needs in view of the situation with regard to research training and employment.

3 Knowledge transfer

The merger of the former research councils in 1993 was also meant to facilitate knowledge transfer and closer contact between basic research at the universities and other parts of research and society. In this respect it is important to have in mind that only one of the former councils was a traditional university oriented research council; the other four were essentially applied and mission oriented, as noted above. (There was no funding mechanism comparable to the single "science vote" which exists in the UK.) The new council has "user representatives" on all boards and committees and is working hard to improve its links to the "the practical world". This includes efforts to commercialize ideas and to strengthen the knowledge base in SMEs. It remains to be seen to what extent the new council's efforts are successful on these accounts.

The universities also try to establish better institutional links with society at large through science parks etc. Their record in this area is not an unequivocal success. Here we should bear in mind the important fact that Norway has a larger institute sector than most OECD countries. This is apparent from Table 3 which compares this sector for eight OECD countries. It is particularly engineering and technology institutes serving industry which count in these figures. Norway has, however, also a considerable research activity in independent institutes engaged in social science / policy research.

Table 3: Key indicators for the institute sector in Norway and seven other OECD countries, 1993. Norwegian kroner.**

Country	Billion NOK	Share of total (%)	Share of GNP (%)	Per capita (NOK)
Canada	14.3	18	0.3	500

Denmark	2.6	17	0.3	510
Finland	3.5	22	0.5	690
The Netherlands	9.7	21	0.4	630
Norway	4.5	32	0.6	1050
Sweden	3.8	9	0.3	440
Germany	51.8	16	0.4	640
Austria *	2.0	14	0.2	260

* 1989 figures

** Source: NIFU

4 National funding agencies

The Norwegian research councils, in particular the former NAVF, the university oriented council already mentioned, have traditionally played an important role in funding university research in Norway. The new council described above is also meant to have an important role in this respect. However, the new council has so far experienced a levelling off in budget appropriations. Essentially the budget for 1998 is still at the 1993 level and actually below in real terms. In the new council, a rather extensive use of research programmes in contrasts to researcher initiated projects has become an issue. Also the limited use of peer review is much debated. The regional dimension, i.e. to what extent the council should give the regional colleges “special treatment” in the coming years, is also noticeable.

5 Mobility

5.1 International mobility

In Norway there is a tradition of going abroad to study resulting from the inability of the educational system to provide sufficient training in some professional fields as well as weak research training. In most of the years since the Second World War, between 10 and 20 per cent of the total number of Norwegian students have been enrolled abroad, mainly in Western Europe outside Scandinavia. This enrolment has been heavily concentrated in certain professional fields like engineering, medicine and dentistry. At the doctoral level, 20 per cent of all holders of doctorates had obtained foreign degrees at the end of the sixties - today this proportion is probably smaller.

In a study of tenured university faculty at the University of Oslo in 1968 we found that 75 per cent of the staff sampled had made at least one visit abroad of not less than one term's duration; each of these persons had an average of two visits. Nearly 80 per cent of the visits were for one year or more. We think the number and direction of long visits of this kind are good indications of active scientific cooperation among counties. Accordingly, we present some data on such visits in Table 4.

Table 4: Visits abroad by University of Oslo staff members in different time periods, according to country of visit (by percentage of all visits)*

Time period	The Nordic countries	Else-where in Europe	Canada and USA	Else where in world	Total No	%
1939 and before	11	71	18	0	28	100
1940 - 1954	15	32	52	0	65	100
1955 - 1968	9	24	61	6	147	100
Total	11	32	53	4	240	100

* Source: Hans Skoie: "The Problems of a Small Scientific Community; the Norwegian Case", *Minerva*, VII/1969:3, p. 399-425.

We notice in Table 4 that Canada and the USA have the highest rate of visitors - 53 per cent in total and particularly so in the postwar period. Eastern Europe has not been specified, but the number was negligible in the early postwar period.

The pattern of such visits in more recent years has been studied in two major surveys of tenured staff in Norwegian universities based on data from 1981 and 1991 respectively and covering all four universities in Norway.

Table 5: Longer research visits abroad by region and field. Percentage of number of visits 1991.*

Region	Humanities	Social Sciences	Natural Sciences	Medicine	Technology
West Europe excluding the Nordic countries	47	30	21	20	21
North America	32	48	64	57	66
Eastern Europe	2	2	-	1	1
Other	6	15	8	12	10
Nordic countries	13	5	8	11	3
Total	100	100	101	101	101
(N)	(198)	(192)	(445)	(160)	(122)

* Source: Inger Marheim Larsen, NIFU Report 11/92

In Table 5 we observe that the North American dominance is still strong in all fields except the humanities. Furthermore, few visit Eastern Europe.

5.2 Internal mobility in Norway

The extent to which Norwegian researchers are mobile, is a question which often surfaces in debates on science policy. The role of the sizable institute sector is usually seen as important in this connection. Studies show that a substantial number of researchers in this sector leave every year to take up jobs in industry, public service etc. It seems to be more worrying that researchers in industry is a modest base for recruitment to both the institute and the university sectors. Within academia, the mobility seems to be modest in Norway both in terms of internal mobility and of staff inclination to leave the sector for other jobs in research or elsewhere.

6 Critical issues and perspectives

The future of university research depends on several factors. First of all, *the size of the sector of higher education* is important. Should we expect this sector to continue to grow in the years to come, or is it likely that the expansion we have seen for years will level off? The percentage of school leavers who go on to higher education is more than 40 per cent in many countries. This high proportion in recent years is probably somewhat influenced by the difficult employment situation for school leavers in many countries.

A second question is related to *the structure of the sector* of higher education - the degree of differentiation among institutions, courses and professions. What share of eligible students chooses classical academic institutions, and what proportion goes to alternative institutions which usually offer shorter courses of vocational/semi-professional character? How do public authorities choose to structure the sector in response to such demand and their judgement of the future job market?

An increase in the flow of students into higher education might lead to greater institutional *diversity*, including a great many institutions which are not intended or able to do research, for example. At the same time, we often find a tendency of "academic drift" in parts of higher education - alternative institutions tend to move closer toward the university model. The courses these institutions offer are increasingly similar to university courses, their staff gets involved in research, and traditional academic values and procedures become dominant. Due to the resources and scientific equipment involved, "academic drift" of this kind may be expected to happen more often in the humanities and social sciences. At the same time the pattern seems to vary considerably with respect to institutional diversity and academic drift in higher education in the Western World today.

A third crucial point is related to *the role of research in the institutions* of higher education and the universities in particular. Due to constraints on the public purse, the expansion of the sector and the increasing cost of research e.g. ("the sophistication factor"), we observe a growing diversity within traditional universities. The number of universities able to sustain a viable research component may actually decrease, and a stratification similar to the American pattern may develop in the sense that only a small group of universities remain proper «research universities». This may happen by deliberate government policy or as a consequence of competition in the area of research funding.

Fourthly, we may also ask what kind of research will be dominant on the campuses of the future? Can we still expect researcher initiated *basic research* to be particularly prominent, or is it more likely that a top-down approach by research councils, industry and government increasingly becomes the order of the day?

The distinction between basic and applied research is not accepted by all. The OECD distinction is based upon the primary *intention* behind the investments made by those who finance the activity. "Basic research" is the term if no special non-scientific criteria are specified or are alluded to by those who finance the activity. "Applied research" means that non-scientific considerations are the basis for the investment by the funder. This does not necessarily mean that the research itself is methodologically or in any other way different. Accordingly, it is not unusual to find both kinds of research at one and the same institution.

In order to still have a fair amount of basic research initiated and controlled by the scientific community, it might be an alternative for research universities to consider restricting

traditional demands for expansion in order to better secure the greater freedom which traditionally goes with basic research. *The continuous demand for growth* in research has increasingly been met with demand for greater influence on research priorities and direction by the funders.

This defence of basic research does not imply that all university research should be basic research, or that the universities should isolate themselves from other areas of society. Nevertheless, the universities should still be the proper home for basic research activities which society wants to fund.

In my view, the role of research in higher education should now be dealt with at length in different quarters. The past expansion and the new economic climate may imply that most governments are no longer willing or able to sustain a vital/sizeable research base in many universities. Basic research may be particularly threatened. The latter kind of research traditionally gives the scientific community a strong role. Accordingly, the vitality and independence of the entire university may be at stake.

Selected literature (in english)

Government documents

On Scientific Research in Norway. White Paper No. 60 (1984-85). Ministry of Cultural and Scientific Affairs.

On Research. Report No. 28 to the Norwegian Storting (1988-89). Ministry of Cultural and Scientific Affairs.

Research for the Community. A report on research. Main issues and priorities in Government Report No. 36 (1992-93). The Ministry of Education, Research and Church Affairs.

OECD

Review of national science policies; Norway. Paris 1970.

Reviews of national policies for education: Norway. Paris 1976.

Social science policy; Norway. Paris 1976

Review of national science policy; Norway. Paris 1983

Reviews of national policies for education: Norway. Paris 1990.

The Norwegian Institute for Studies in Research and Higher Education (NIFU)

Bie, Karen Nossun: Creating a New University. The establishment and development of the University of Tromsø. Oslo, NAVF-U, Melding 1981:3.

Friedman, Robert Marc: Appropriating the Weather: Vilhelm Bjerknes and the Construction of a Modern Meteorology. Cornell University Press, Ithaca, N.Y., 1989.

Kyvik, Svein: The Norwegian Regional Colleges. A Study of the Establishment and Implementation of a Reform in Higher Education. NAVF-U, Melding 1981:1.

Kyvik, Svein. Productivity in Academia. Scientific Publishing at Norwegian Universities. Scandinavian University Press, Oslo. 1991.

Kyvik, S og O. Tvede: The Doctorate in the Nordic Countries. *Comparative Education*, 1988, 34.

Larsen, I. M. og Å. Gornitzka (1995): New Management Systems in Norwegian Universities: the interface between reform and institutional understanding». *European Journal of Education*, Vol. 30, No. 3, 1995, p. 347-361.

Skodvin, Ole-Jacob: The Reorganisation of Non-University Higher Education in Norway: Problems and Potentials. *Tertiary Education and Management*, Vol., 3, No. 4, 1997, p. 317-324.

Skoie, Hans: *Science Policy Studies in Norway*, NIFU Report 3/94.

Skoie, Hans: *Norway - a Province of Science in a Changing World* (Collections of articles). Center for Technology and Society, University of Trondheim, 1997.

Aamodt, Per Olaf: Floods, bottlenecks and backwaters: an analysis of expansion in higher education in Norway. *Higher Education* 30: 1995, p. 63-80.

