



2015

Science and Technology Indicators

R&D statistics

NIFU

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Introduction

This booklet, containing tables and figures on R&D statistics and science and technology indicators, has been published annually since 1997. The web-edition can be found at www.nifu.no/en/statistics/. A broader coverage of S&T input and output data is also published annually in the Report on Science and Technology Indicators for Norway by The Research Council of Norway. The 2015-edition will be published in September. The 2015-edition will also include an abridged english version published in December 2015. The internet version of the report is regularly updated. You may also find information at www.foustatistikbanken.no. All expenditures are given in current prices, unless otherwise indicated. In 2013 1.00 PPP US\$ = 9.2 NOK (Main Science and Technology Indicators 2014-2, OECD). By May 2015 1 Euro = 8.4 NOK.

Who prepares the R&D statistics?

NIFU and Statistics Norway carry out the statistical surveys on resources devoted to R&D in Norway. NIFU is responsible for collecting, processing and disseminating statistics and indicators regarding the institute sector (see classification on page four) and the higher education sector, while Statistics Norway is responsible for the industrial sector. NIFU is also responsible for compiling the information into national totals for Norway. In the industrial and institute sectors, and the health trusts, annual statistical surveys are carried out. In the higher education sector the survey is carried out every second year. For all sectors main figures are presented annually. Further information may be found at: www.nifu.no/en/statistics/.

How are R&D statistics compiled?

Norwegian R&D statistics are compiled in accordance with the international guidelines proposed by the OECD in the "Frascati Manual" (The Measurement of Scientific and Technological activities: Proposed Standard Practice for Surveys on Research and Experimental Development "Frascati Manual 2002", OECD 2002). A new and revised edition will be published in October 2015. R&D statistics for Norway are based on administrative registers and questionnaires sent to the R&D performing units in each sector.

The survey on R&D activity in **the industrial sector** covers all companies with 50 or more employees. In addition, the survey includes a sample of companies with a minimum of 10 employees. Prior to 1995, the survey only included companies with 50 or more employees. Statistics on the Industrial sector from 1995 onwards are therefore not comparable with previous years.

In **the higher education sector** each individual department or corresponding equivalent unit is surveyed. Supplementary sources of information include surveys on staff time distribution, information on personnel and expenditure from the institutions' central administration, information from the Research Council of Norway, and from medical foundations.

The institute sector is also fully covered by exhaustive surveys. Questionnaires are sent to research institutes and other institutions that are expected to perform R&D activities. R&D performed at museums is estimated.

Statistics on R&D resources in **health trusts** (university hospitals and other hospitals), are collected through a separate, national reporting system. Since the 2007 edition, the reporting system for health trusts has been integrated with that for national R&D statistics. In international R&D statistics, university hospitals are included in the higher education sector, while other hospitals are included in the government sector/institute sector.

Basic definitions of research and experimental development (R&D)

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Three types of R&D may be distinguished:

- **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.
- **Applied research** is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
- **Experimental development** is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

Sector classification

Norwegian R&D statistics are generally presented divided into three sectors: Industrial sector, institute sector and higher education sector. The higher education sector, university hospitals included, corresponds to the OECD higher education sector. For international comparisons business enterprise sector includes the industrial sector as well as non-profit research institutes serving enterprises. In national statistics, these business-oriented research institutes are included in the institute sector, which also covers the government sector and private non-profit sector (PNP). The PNP sector is relatively small in Norway, and is therefore merged into the government sector in international statistics presentations.

In this publication, health trusts are sometimes presented apart.

Other data sources

Statistics on R&D personnel in the higher education and institute sectors are based on NIFU's Register of Research personnel. The register is updated annually. International R&D statistics are extracted from the OECD's Main Science and Technology Indicators and the OECD online database. Information about doctoral students and awarded doctoral degrees in the Nordic and Baltic countries is from NORBAL, a database operated by NIFU. The doctoral degree statistics are based on NIFU's Norwegian Doctoral degree register, which is updated biannually. Bibliometric data are extracted from the database Web of Science prepared by the Thomson Reuters in the U.S. This database contains world-wide publication and citation statistics. Patent data are from the Norwegian Industrial Property Office.

Highlights

- Total R&D expenditure in Norway amounted to 50.7 billion NOK in 2013, an increase from 48.0 billion NOK in 2012 and 45.4 billion NOK in 2011.
- R&D expenditure in 2013 amounted to 1.66 per cent of GDP. In the OECD area the average R&D share of GDP was 2.40 per cent (2013), corresponding to 1.92 per cent for the EU-28.
- Norway spent 10 035 NOK on R&D per capita in 2013. Denmark and Sweden spent 12 320 and 13 567 NOK, respectively.
- The health region South East had the highest share of current expenditure for R&D within the field of psychiatric healthcare in Norway.
- Measured in R&D expenditure, the University of Copenhagen was the largest in the Nordic countries in 2013, followed by the Lund University.
- According to the government budget appropriations or outlays for R&D (GBAORD) The Ministry of Education and Research allocated the most for R&D (13.6 billion NOK), followed by the Ministry of Health and Care Services (4.0 billion NOK) and The Ministry of Trade, Industry, and Fisheries (3.8 billion NOK).
- About 68 200 people participated in R&D in Norway in 2013. 47 800 were researchers/academic staff. 36 per cent were women, and the share of women was highest at hospitals, with 48 per cent women. 34 per cent of the total research staff were doctorates.
- In 2014, more doctoral degrees awarded in Norway were presented by women than men. The highest women's share was within medical and health sciences.
- Norway contributed 0.62 percent of the world's scientific knowledge production, measured as the sum of all countries' article production. The percentage has increased over the last decade and amounted 0.52 per cent in 2003.
- The extent of international cooperation has increased significantly over the last two decades. USA, UK, Sweden and Germany rank as the countries Norwegian researchers collaborate most frequently with, measured through co-authorship.
- Per 1 000 organisations there are most trademarks registered in Oslo county, while Rogaland county ranks highest for number of patent applications.

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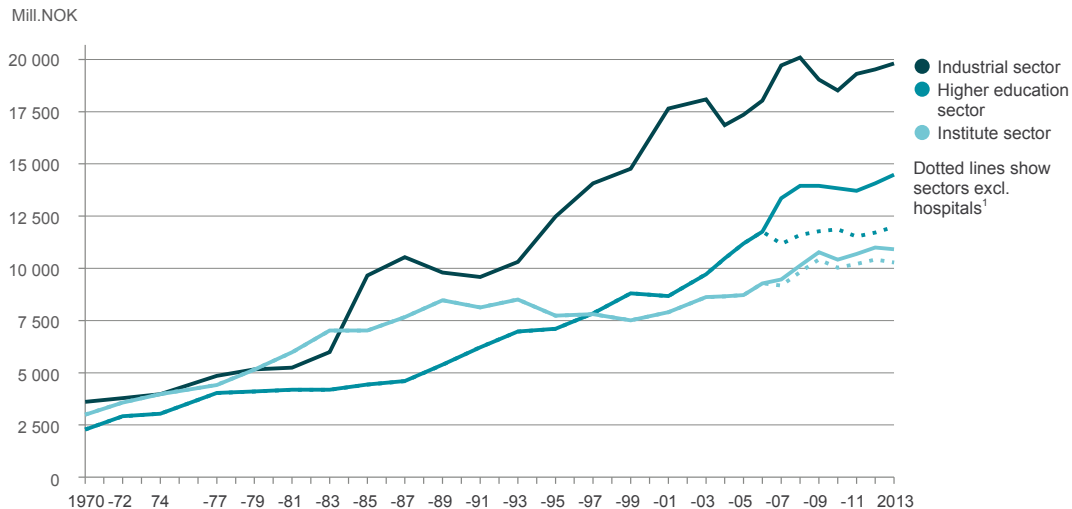
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1 R&D expenditure in Norway by sector of performance: 1970–2013.
Fixed 2010-prices. NOK.



¹ Hospitals in the higher education sector (university hospitals) and institute sector (other health trusts and private, non-profit hospitals).
Source: NIFU/Statistics Norway, R&D statistics

2 R&D expenditure in Norway by type of institution and source of funds. 2013. Million NOK.

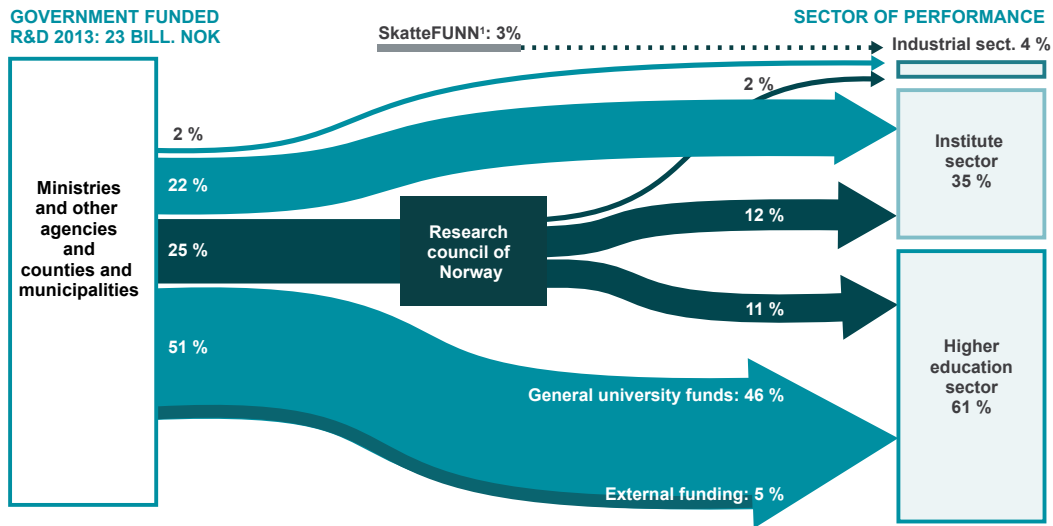
Type of institution	Total	Industry		Government		Other ¹	Abroad	
		Total	Of Which: oil-com- panies	Total	Of Which: Research council of Norway		Total	Of Which: EU- comm.
Industrial sector	22 557	17 918	..	934	425	653	3 052	99
Institute sector	11 492	2 457	523	7 307	2 820	415	1 312	442
Of which: Research inst. serving enterprises	4 079	1 746	365	1 535	992	203	596	224
Government sector	7 413	712	158	5 773	1 829	213	716	219
Universities and colleges	13 229	615	160	11 623	2 314	581	411	304
Of which: Univ. and spec. univ. inst.	11 817	583	159	10 279	2 171	562	393	292
State university colleges	1 413	32	1	1 344	144	19	18	12
Health trusts	3 470	55	-	3 218	163	168	30	20
Of which: University hospitals	2 772	45	-	2 560	157	138	29	19
Health trusts and private, non-profit hospitals	698	10	-	658	7	30	1	1
Total	50 748	21 044	..	23 082	5 723	1 817	4 805	865

¹ Includes private funding, own funds and tax deduction fund "SkatteFunn" in Industrial sector.

² Excluding hospitals.

Source: NIFU/Statistics Norway, R&D statistics

3 Government financed R&D by source of funds and sector of performance. Norway. 2013. Percentage of total government financed R&D.



¹ SkatteFUNN is a tax-deduction fund, and is not included in the total amount of government funded R&D.

4 R&D expenditure as a percentage of the gross domestic product (GDP), by source of funds, and sector of performance in 2013¹.

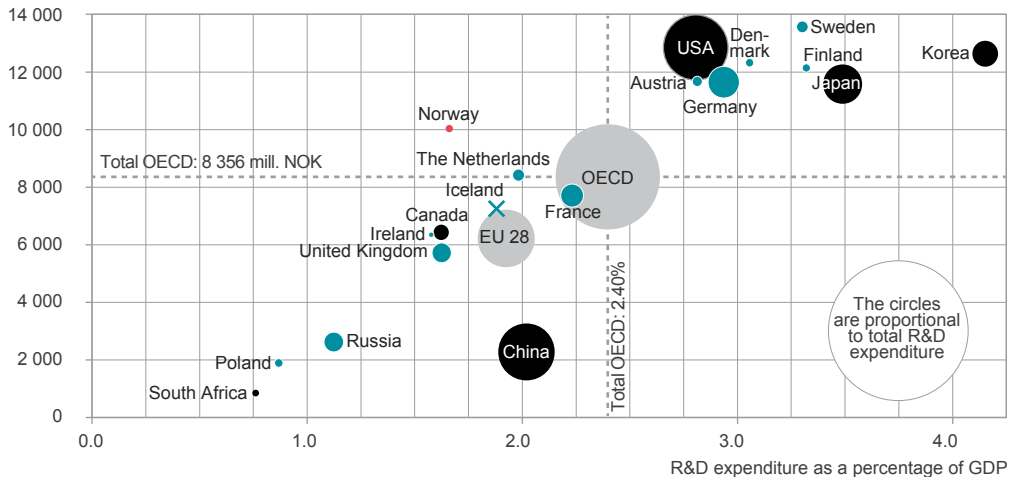
Country	R&D expenditure as a percentage of GDP							R&D expenditure per capita NOK
	Total	Sector of performance			Source of funds			
		Industrial sector ²	Higher ed. sector	Government sector	Government	Industry	Other	
Austria	2.81	1.93	0.72	0.16	1.10	1.24	0.47	11 674
China	2.02	1.55	0.14	0.33	0.42	1.51	0.09	2 276
Denmark	3.06	2.00	0.97	0.09	0.90	1.83	0.33	12 320
Finland	3.32	2.29	0.71	0.32	0.86	2.02	0.44	12 142
France	2.23	1.44	0.47	0.32	0.78	1.24	0.21	7 712
Germany	2.88	1.96	0.51	0.41	0.84	1.90	0.14	10 945
Iceland	1.88	0.98	0.62	0.28	0.83	0.88	0.17	7 281
Japan	3.49	2.67	0.47	0.35	0.61	2.63	0.25	11 583
Korea	4.03	3.14	0.39	0.50	0.96	3.01	0.06	11 477
Norway	1.66	0.87	0.53	0.26	0.75	0.69	0.22	10 035
Russia	1.12	0.68	0.10	0.34	0.76	0.31	0.05	2 622
Sweden	3.30	2.24	0.89	0.17	0.93	2.01	0.36	13 567
The Netherlands	1.98	1.14	0.63	0.21	0.68	0.93	0.37	8 424
United Kingdom	1.63	1.05	0.43	0.15	0.44	0.76	0.43	5 723
USA	2.81	1.96	0.39	0.46	0.87	1.66	0.28	12 850
Total OECD	2.37	1.61	0.43	0.33	0.70	1.42	0.25	7 838
EU 28	1.92	1.20	0.45	0.27	0.64	1.04	0.24	5 917

¹ Where 2013 data is not available, date of reference is 2012 (France, Korea, Germany, USA, OECD, EU 28).

Sources: OECD–Main Science and Technology Indicators 2014–2 and national sources

5 R&D expenditure per capita (NOK) and as a percentage of the gross domestic product (GDP) in selected OECD countries: 2013¹.

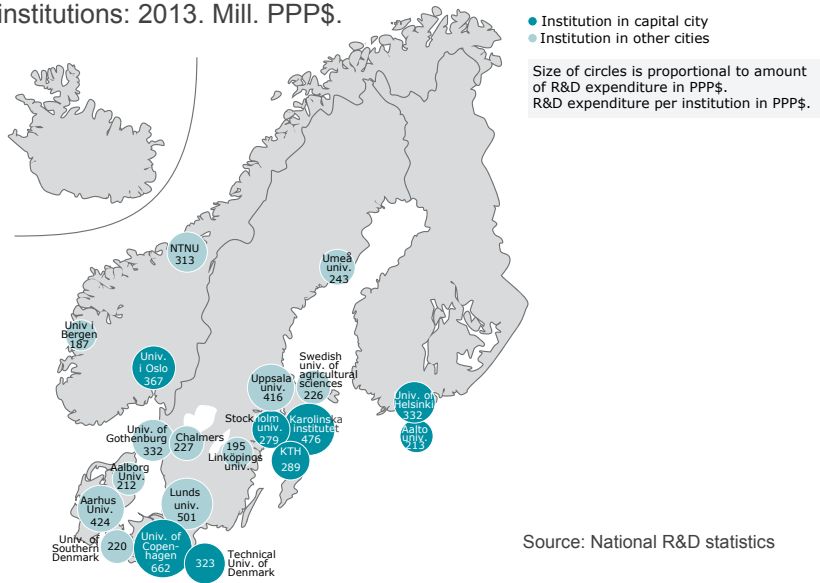
R&D expenditure per capita (NOK)



¹Where 2013-data is not available, date of reference is 2012 (Ireland, South Africa, USA).

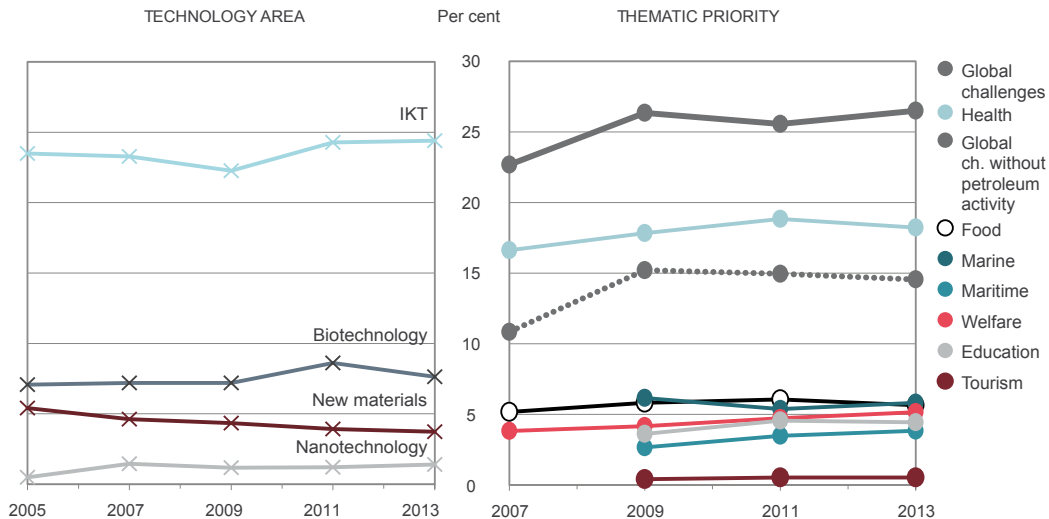
Sources: OECD - Main Science and Technology Indicators 2014-2 and national sources

6 Higher education R&D expenditure (HERD) in the Nordic countries by 20 largest institutions: 2013. Mill. PPP\$.



Source: National R&D statistics

7 Current R&D expenditure by technology areas and thematic priorities as a share of total current R&D expenditure. Norway. 2005/2007–2013. Per cent.

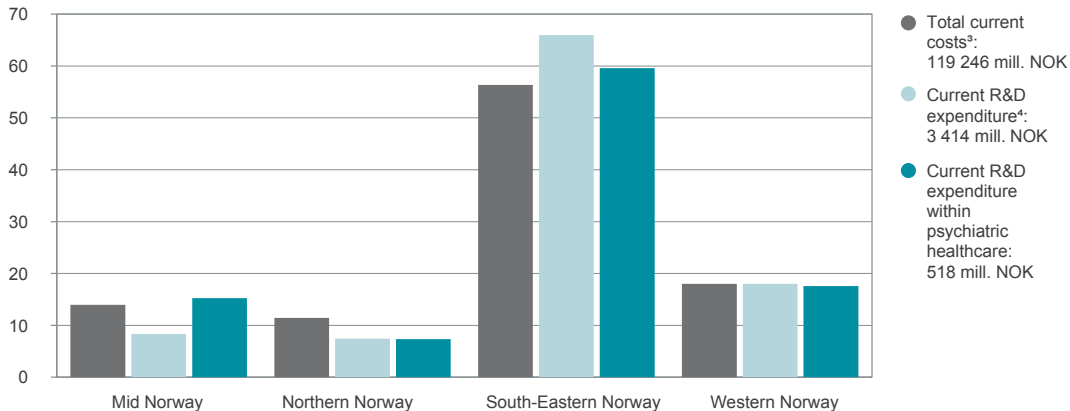


¹ For the industrial sector data are not collected for the following thematic priorities: Welfare, education and tourism.

Source: NIFU/Statistics Norway, R&D statistics

8 Resources for all mandatory activities¹, for total R&D and for R&D within psychiatric healthcare in Norwegian health trusts² by health region in 2013. Per cent.

Per cent



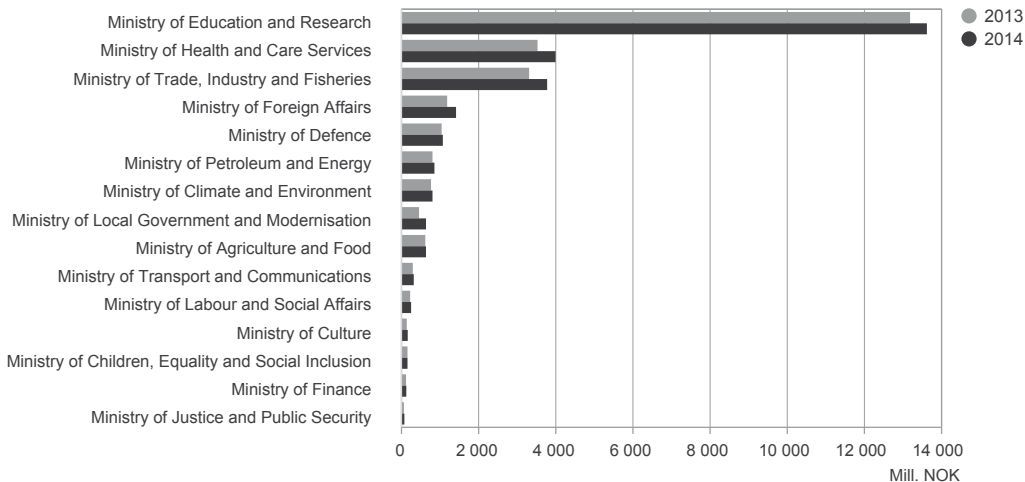
¹ Mandatory activities is measured in costs, while resources for R&D are expenditure.

² Includes private, non-profit hospitals with contracts with a regional health trust.

³ Source: Regional health trusts and private, non-profit hospitals.

⁴ Source: NIFU, use of resources in the health trusts.

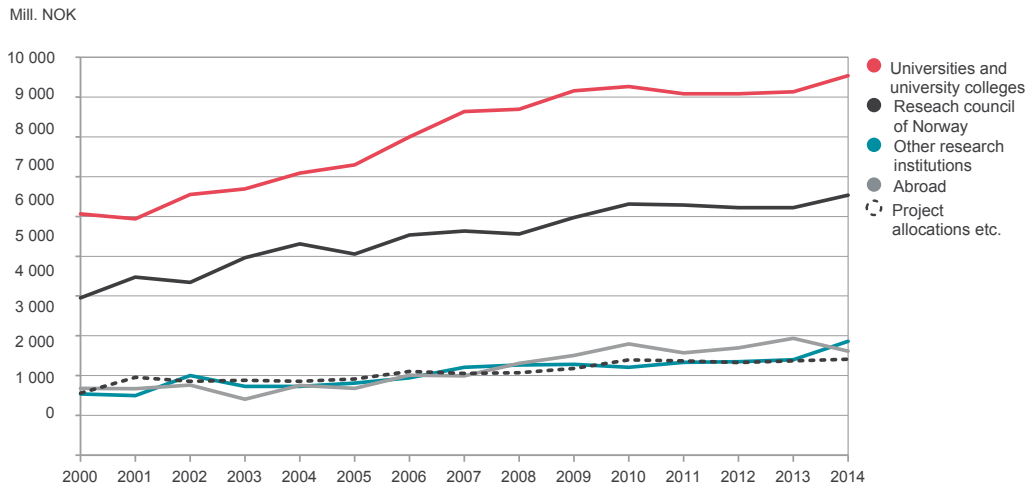
9 Government budget appropriations or outlays for R&D (GBAORD) in Norway by ministry. 2013 and 2014. Mill. NOK.



¹ The presentation follows the structure of ministries of 2014.

Source: NIFU

10 Government budget appropriations or outlays for R&D (GBAORD) in Norway by primary recipient and budget term. 2000–2014. Mill. NOK.



Source: NIFU

11 R&D personnel by type of institution in Norway. 2013.
Head count and full time equivalents (FTE).

Type of institution	Head count by 01.10.2013			Full time equivalents	
	Total R&D personnel	Of which: Researchers/academic staff	Tech. & supp. staff	Total	Of which: Researchers/academic staff
Industrial sector	25 324	16 667	8 657	16 371	11 508
Institute sector¹	11 022	7 654	3 368	8 785	6 308
Of which: Research instit. serving enterprises	2 995	2 170	772	2 562	1 957
Government sector	8 027	5 464	2 563	6 115	4 335
Universities and univ. colleges	26 115	19 608	6 547	10 401	8 661
Of which: Universities	17 354	12 227	5 127	8 346	6 793
Spec. university institutions etc.	2 438	2 058	380	833	751
State univeristy colleges	6 363	5 323	1 040	1 222	1 117
Health trusts	5 703	3 866	1 837	2 977	1 762
Of which: University hospitals	3 771	2 830	941	2 166	1 325
Health trusts and private, non-profit hospitals ²	1 140	720	420	582	337
Total	68 204	47 795	20 409	38 846	28 311

¹ Excluding hospitals

Source: NIFU/Statistics Norway, R&D statistics

12 Researchers/academic staff (head count) in Norway by type of institution:
2013. Doctorates and women.

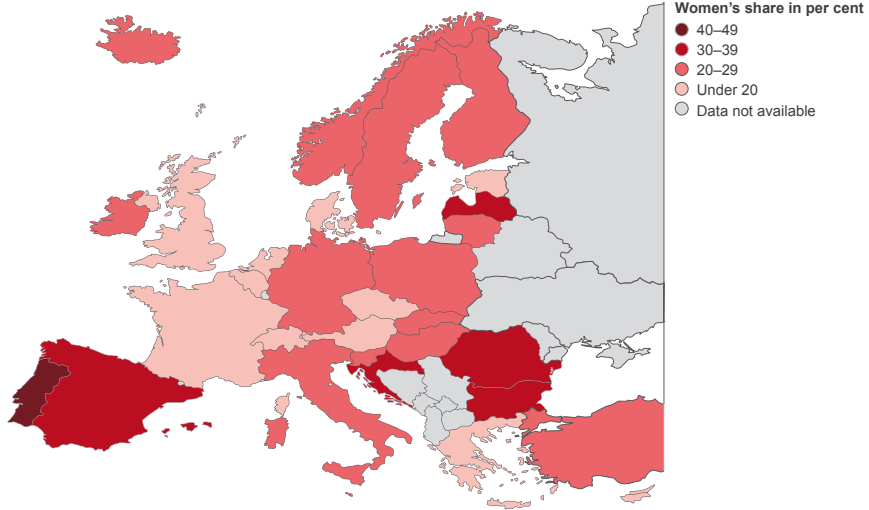
Type of institution	Totalt			Doctorate holders ¹			
	Total Number	Women Number	%	Total Number	%	Women Number	%
Industrial sector	16 667	3 148	19	1 911	11	440	12
Institute sector²	7 666	3 094	40	3 626	47	1 321	43
Of which: Research inst. serving enterprises	2 170	655	30	1 077	50	306	47
Government sector	5 496	2 439	44	2 549	46	1 015	42
Universities and univ. colleges	19 071	8 741	46	8 124	43	3 034	35
Of which: Universities	11 991	5 117	43	6 031	50	2 201	43
Spec. university institutions etc.	1 826	788	43	697	38	237	30
State university colleges	5 254	2 836	54	1 396	27	596	21
Health trusts	3 550	1 613	45	1 731	49	693	43
Of which: University hospitals	2 830	1 269	45	1 487	53	595	47
Health trusts and private, non-profit hospitals	720	344	48	244	34	98	28
Total	47 795	17 219	36	16 106	34	5 468	33

¹ Also includes licenciates.

² Excluding hospitals.

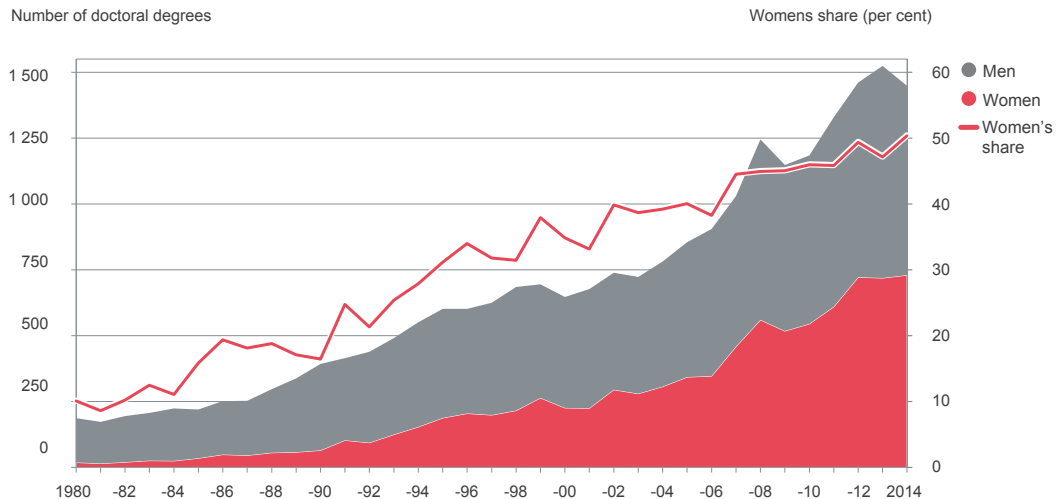
Source: NIFU/Statistics Norway, R&D statistics

13 Gender equality among full professors (grade A personnel) in selected European countries.



Sources: ETER (2011/2012) and She figures (2009/2010), European Commission

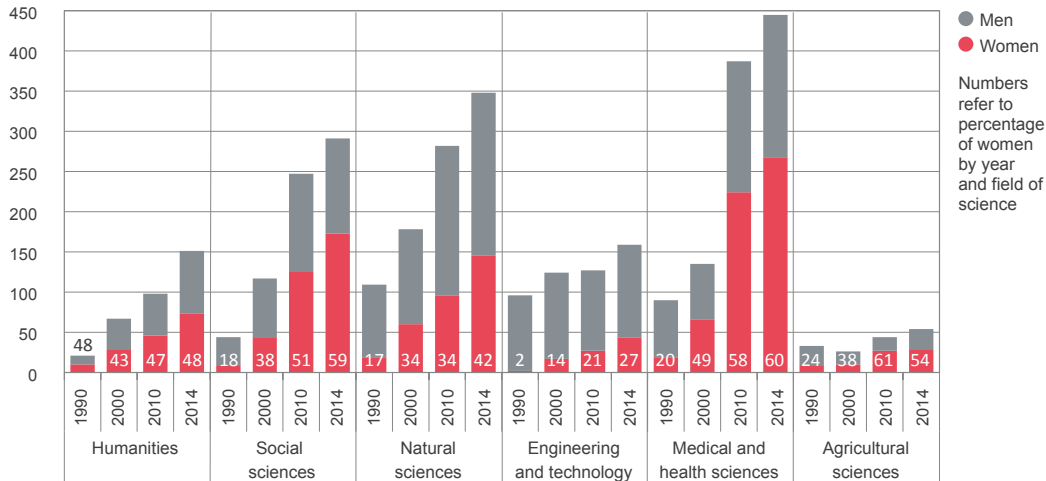
14 Awarded doctoral degrees in Norway by sex. 1980–2013.



Source: NIFU/The Doctoral degree register

15 Awarded doctoral degrees in Norway in 1990, 2000, 2010 and 2014 by field of science. Percentage of women in the diagram.

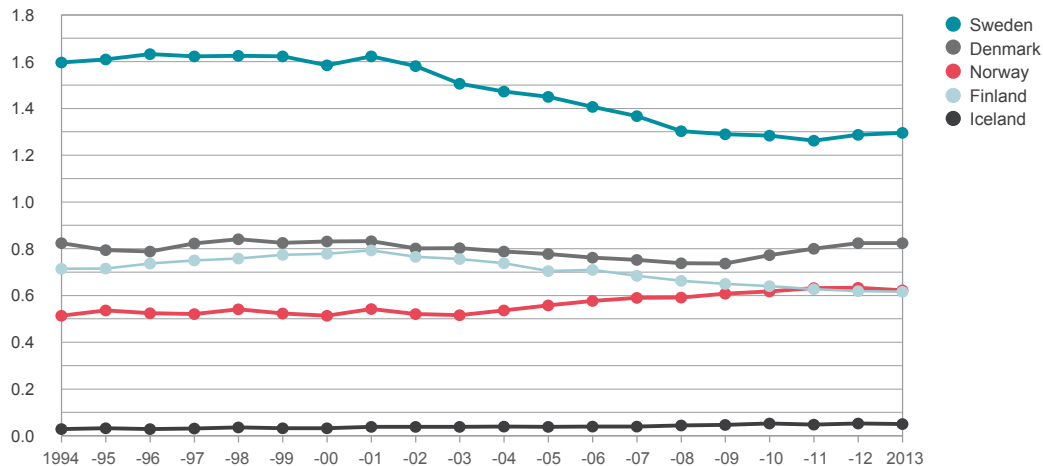
Number of doctoral degrees



Source: NIFU, The Doctoral degree register

16 Scientific publishing 1994–2013 in the Nordic countries. Proportion of the world production.¹

Per cent

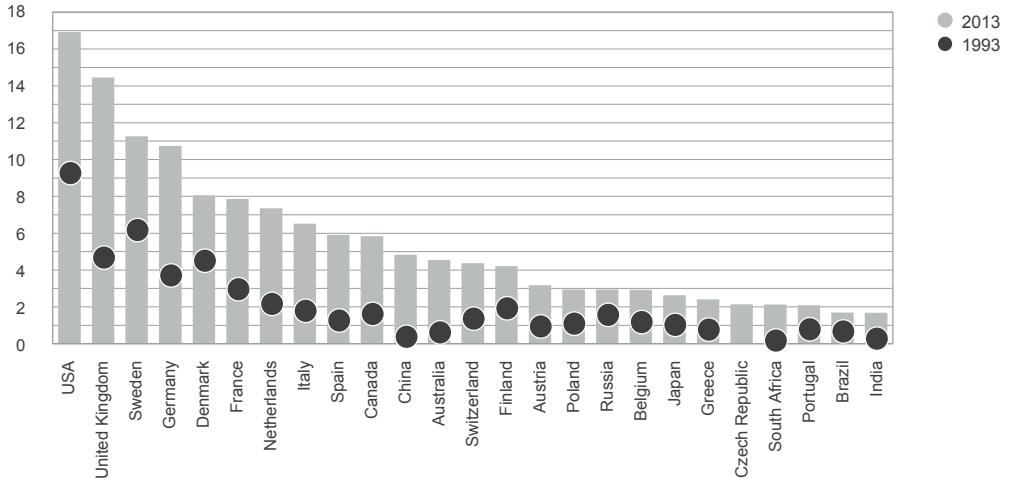


¹ The proportion of the world production is calculated using sum of all countries' production as denominator.

Source: Thomson Reuters/CWTS Web of Science. Computations: NIFU.

17 Co-authorship between Norway and foreign countries, 1993 and 2013. Proportion of the total Norwegian article production with co-authors from the different countries¹.

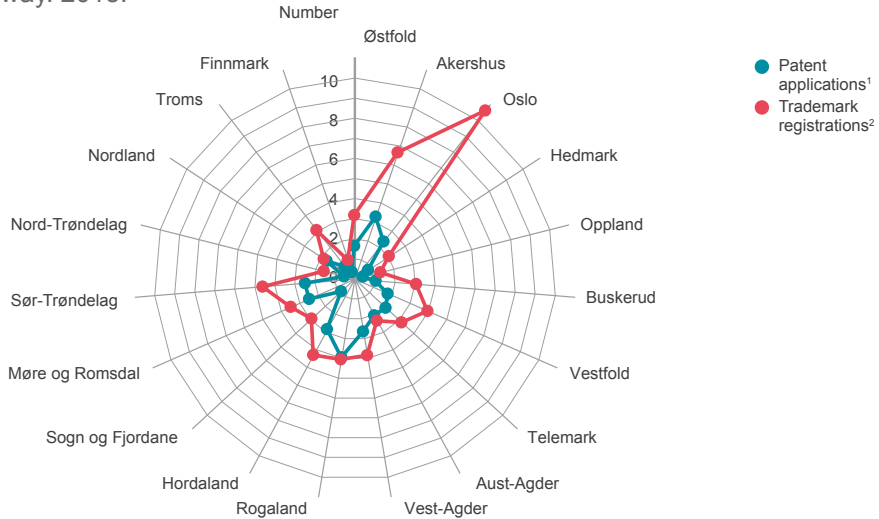
Per cent



¹ Limited to the 25 most frequent collaborative countries in 2013.

Source: Thomson Reuters/CWTS Web of Science. Computations: NIFU

Patent applications and trademark registrations per 1 000 organisations by county. Norway. 2013.



Source: The Norwegian Industrial Property Office / Statistics Norway. Calculations by NIFU