



2016

# Science and Technology Indicators

R&D statistics

**NIFU**

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R&D statistics

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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/](http://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 2016-edition will be published in September. The 2015-edition included an abridged english version. The internet version of the report is regularly updated. You may also find information at [www.foustatistikbanken.no](http://www.foustatistikbanken.no). All expenditures are given in current prices, unless otherwise indicated. In 2014 1.00 PPP US\$ = 9.3 NOK (Main Science and Technology Indicators 2015-2, OECD). By May 2016 1 Euro = 9.3 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/](http://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 was 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.

### Legend to tables

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- : numbers may not be published
- zero
- 0 less than 0.5 of the unit

## Highlights

- Total R&D expenditure in Norway amounted to 54.0 billion NOK in 2014, an increase from 50.7 billion NOK in 2013 and 48.0 billion NOK in 2012.
- Norwegian R&D expenditure in 2014 amounted to 1.71 % of GDP. In the OECD area the average R&D share of GDP was 2.37 % (2014), corresponding to 1.94 % for the EU 28.
- Norway spent 10 469 NOK on R&D per capita in 2014. Denmark and Sweden spent 13 117 and 13 380 NOK, respectively.
- The business enterprise sector R&D amounted to 54 per cent of total R&D in Norway in 2014. This share was higher in the other Nordic countries, especially in Finland and Sweden at 68 and 67 per cent, respectively.
- Over the last decades the global distribution of R&D has changed. The Asian share of R&D has increased from 26 per cent in 1996 to 42 per cent in 2013, while the decrease is shared among America and Europa and there is stability in other regions.
- The highest R&D expenditure within climate, environmental and polar research were performed at the institute sector, followed by the higher education sector, while the industrial sector was the smallest R&D performing sector within these fields.
- At university hospital trusts, expenditure on R&D amounted to 5 per cent of total current expenditure in 2014. Other hospital trusts spent a little more than one per cent of current expenditure on R&D.
- In 2014, close to 72 000 persons were involved in R&D in Norway. Of these, researchers amounted to 70 per cent and support staff had 30 per cent share. Total R&D personnel performed 40 300 FTEs, almost 40 per cent were related to industrial sector.
- 53 per cent of new doctoral degrees in Norway were in 2015 awarded to women, most of them in medical sciences and social sciences.
- In 2015, 37 per cent of the Norwegian doctoral degrees were awarded to foreign citizens. In the period 2010–2015, 32 per cent of the foreign doctorates came from Asia, 25 per cent from Western or Southern Europe, 14 per cent from Africa and 12 per cent from Eastern Europe. 10 per cent came from North-America or Latin-America or Australia.
- Norway ranks as number five in the world with regard to the number of scientific articles on polar research 2012–2014. Most of the Norwegian polar articles are related to the Arctic area.



## Table of contents

### R&D expenditure

- 1 By sector of performance. Norway. 1970–2014
- 2 By type of institution and source of funds. Norway. 2014
- 3 As a percentage of the GDP by source of funds, sector of performance and per capita. Selected OECD-countries. 2014
- 4 Global R&D expenditure by region. 1996–2013
- 5 By sector of performance in the Nordic countries: Per capita in PPP\$, fixed prices, and per cent. 2004–2014
- 6 R&D concentration in the institute sector by county. Per cent of total R&D and location of the largest R&D performing units. 2014.
- 7 For climate, environmental and polar research by sector of performance. 2014.
- 8 Total current expenditure and current expenditure for R&D in Norway by type of health trust and health region. 2014

### Government budget appropriations or outlays for R&D

- 9 GBAORD by socio-economic objective. Norway. 2015
- 10 By type of ministry and budget term. Norway. 2000–2015

### R&D personnel

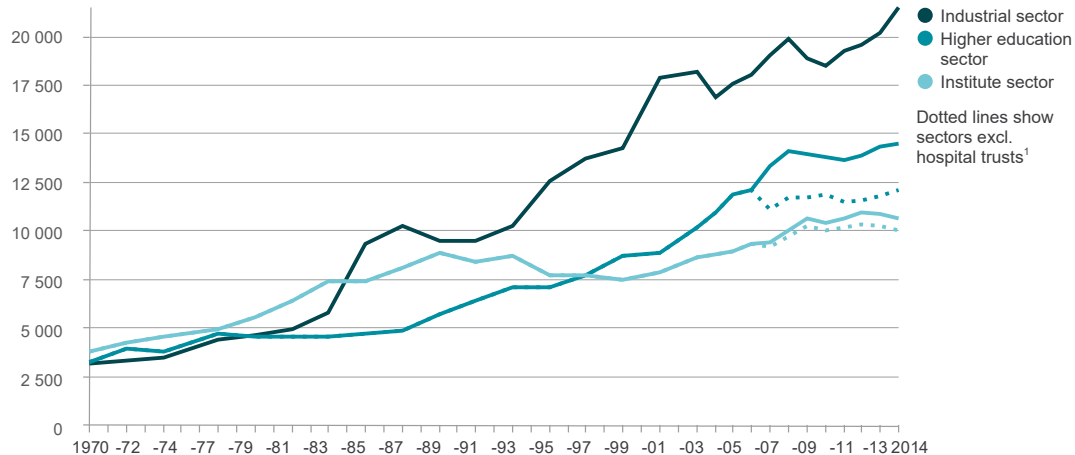
- 11 By type of institution in Norway. Head count and FTE. 2014
- 12 Researchers by type of institution. Women and doctorates. Norway. Head count. 2014
- 13 Post doctors in Norway in 2001 and 2005 eight years after registration by type of position/sector, gender and field of science
- 14 Gender equality among full professors (grade A personnel) in selected European countries. 2013. Per cent
- 15 Awarded doctoral degrees in Norway by sex. 1980–2015
- 16 Awarded doctoral degrees in Norway by citizenship. 2010–2015

### Bibliometrics

- 17 Total number of polar research articles by country and polar region. 2012–2014
- 18 Number of articles per 1000 capita (2014) and relative citation index (2010–2013) for selected countries

# 1 R&D expenditure in Norway by sector of performance: 1970–2014. Fixed 2010-prices. NOK.

Mill. NOK



<sup>1</sup> Hospitals in the higher education sector (university hospital trusts) and institute sector (other hospital trusts).

Source: NIFU/Statistics Norway, R&D statistics

**2** R&D expenditure in Norway by type of institution and source of funds.  
2014. Million NOK.

Type of institution	Total	Industrial sector		Government		Other <sup>1</sup>	Abroad	
		Total	Of which: Oil companies	Total	Of which Research council		Total	Of which: EU-comm.
<b>Industrial sector</b>	<b>24 802</b>	<b>19 558</b>	..	<b>990</b>	<b>517</b>	<b>890</b>	<b>3 364</b>	<b>121</b>
<b>Institute sector<sup>2</sup></b>	<b>11 610</b>	<b>2 622</b>	<b>481</b>	<b>7 286</b>	<b>2 794</b>	<b>399</b>	<b>1 302</b>	<b>432</b>
Of which: Research inst. serving enterprises	4 137	1 859	318	1 472	1 017	239	566	226
Government sector	7 473	763	163	5 814	1 777	160	736	206
	14 020	..	..	..	..	..	..	..
<b>Universities and colleges</b>	<b>3 436</b>	<b>58</b>	-	<b>3 128</b>	<b>210</b>	<b>216</b>	<b>33</b>	<b>21</b>
<b>Hospital trusts</b>	<b>2 701</b>	<b>35</b>	-	<b>2 457</b>	<b>197</b>	<b>180</b>	<b>29</b>	<b>17</b>
Of which: University hospital trusts								
Other hospital trusts	736	23	-	672	13	36	4	4
<b>Total</b>	<b>53 867</b>	..	..	..	..	..	..	..

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

<sup>2</sup> Excluding hospitals.

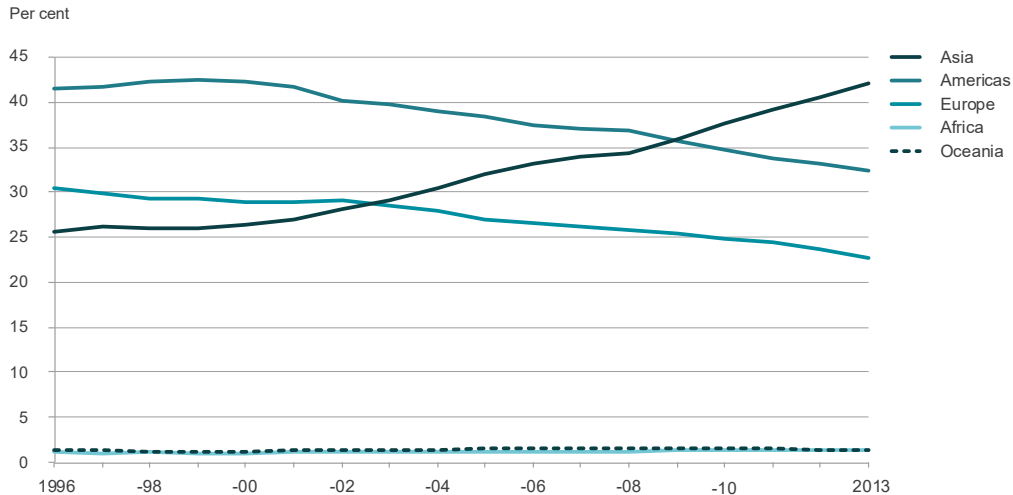
Source: NIFU/Statistics Norway, R&D statistics

**3** R&D expenditure as a percentage of the gross domestic product (GDP), by source of funds, and sector of performance in 2014.

Country	R&D expenditure as a percentage of GDP							R&D expenditure per capita NOK
	Total	Sector of performance			Source of funds			
		Industrial sector	Higher ed. sector	Government sector	Government	Industry	Other	
Austria	2.99	2.11	0.73	0.15	1.13	1.39	0.47	13 308
Canada	1.61	0.80	0.65	0.16	0.56	0.73	0.32	6 787
China	2.05	1.58	0.14	0.33	0.42	1.54	0.09	2 519
Denmark	3.05	1.96	1.01	0.08	0.93	1.77	0.36	13 117
Finland	3.17	2.15	0.72	0.30	0.87	1.70	0.60	12 061
France	2.26	1.46	0.47	0.33	0.80	1.24	0.22	8 297
Germany	2.84	1.93	0.49	0.42	0.83	1.86	0.15	12 322
Iceland	1.89	1.07	0.67	0.15	0.66	0.74	0.49	7 773
Japan	3.58	2.78	0.45	0.35	0.57	2.77	0.24	12 273
Korea	4.29	3.36	0.39	0.54	0.99	3.23	0.07	13 393
<b>Norway</b>	<b>1.71</b>	<b>0.92</b>	<b>0.53</b>	<b>0.26</b>	<b>0.78</b>	<b>0.74</b>	<b>0.19</b>	<b>10 469</b>
Russia	1.19	0.71	0.12	0.36	0.82	0.32	0.05	2 320
Sweden	3.16	2.12	0.92	0.12	0.89	1.93	0.34	13 380
The Netherlands	1.97	1.11	0.64	0.22	0.65	1.02	0.31	8 896
United Kingdom	1.70	1.10	0.44	0.16	0.49	0.79	0.42	6 390
USA	2.74	1.93	0.39	0.42	0.76	1.67	0.31	13 051
<b>Total OECD</b>	<b>2.37</b>	<b>1.63</b>	<b>0.42</b>	<b>0.32</b>	<b>0.67</b>	<b>1.44</b>	<b>0.26</b>	<b>8 696</b>
<b>EU 28</b>	<b>1.94</b>	<b>1.23</b>	<b>0.45</b>	<b>0.26</b>	<b>0.64</b>	<b>1.05</b>	<b>0.25</b>	<b>6 676</b>

Sources: OECD – Main Science and Technology Indicators 2015–2 and national sources

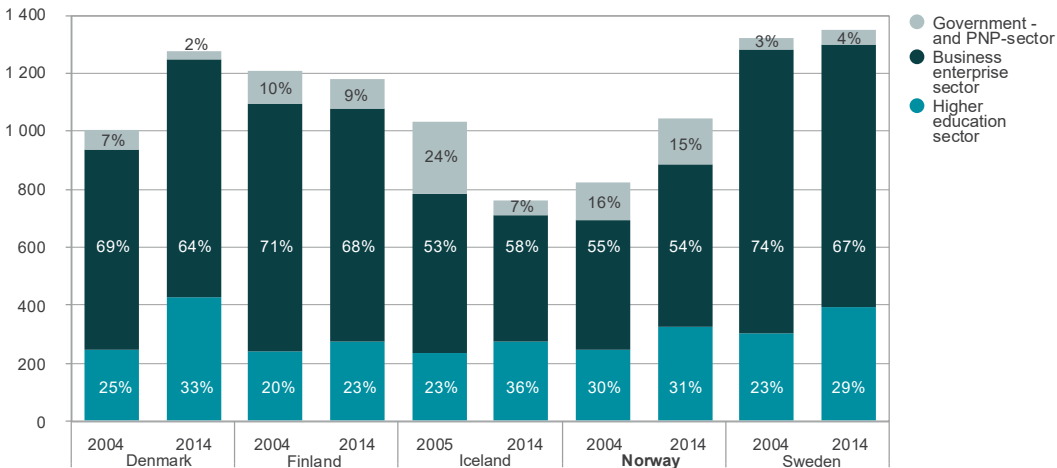
## 4 Global R&D expenditure by region. 1996–2013.



Source: UNESCO Institute for Statistics

## 5 R&D expenditure by sector of performance in the Nordic countries: Per capita in PPP\$, fixed prices, and per cent. 2004–2014.

Mill. PPP\$ per capita



<sup>1</sup> Population growth in the period: Denmark: 4 %, Finland: 4 %, Iceland: 12 %, Norway: 12 %, Sweden: 8 %.

Source: OECD – Main Science and Technology Indicators 2015–2

## 6 R&D concentration in the institute sector by county. Per cent of total R&D and location of the largest R&D performing units.

R&D expenditure in the institute sector (excl. hospitals)

- Over 20 per cent
- 10–20 per cent
- 2–10 per cent
- Under 2 per cent

SINTEF, Marintek, NINA, NGU, NTNU  
Social Research, Centre for Rural  
Research, PFI

Møreforskning, *Nofima*,  
*Bioforsk*

Vestlandsforskning,  
*Bioforsk*  
Institute of Marine  
Research, Uni Research,  
NIFES, CMI, CMR,  
NERSC, SNF, *Nofima*  
IRIS, *Nofima*, Polytec,  
*Bioforsk*

Telemark Research  
Institute, Tel-Tek

Agderforskning

*Institute of Marine Re-*  
*search*, NIVA, *Bioforsk*

Møre og Romsdal

Sogn og  
Fjordane

Hordaland

Rogaland

Buskerud

Tele-  
mark

Vest-Agder

Aust-Agder

Sør-Trøndelag

Hedmark

Oppland

Akershus

Oslo

Vestfold

Østfold

Nordland

Nord-Trøndelag

Troms

Finnmark

Finnmark: *Norut*, *Bioforsk*

Troms: *Nofima*, *Norut*, Norwegian Polar Institute,  
*Institute of Marine Research*, GenØk, NILU

Nordland Research Institute, *Norut*, *Bioforsk*

Trøndelag R&D Institute, *Bioforsk*

Eastern Norway Research Institute, NIVA

SINTEF, Eastern Norway Research Institute, NINA  
FFI, IFE, *Bioforsk*, Norwegian Forestry and Landscape  
Institute, NILU, *Nofima*, Simula, NORSAR, FNI

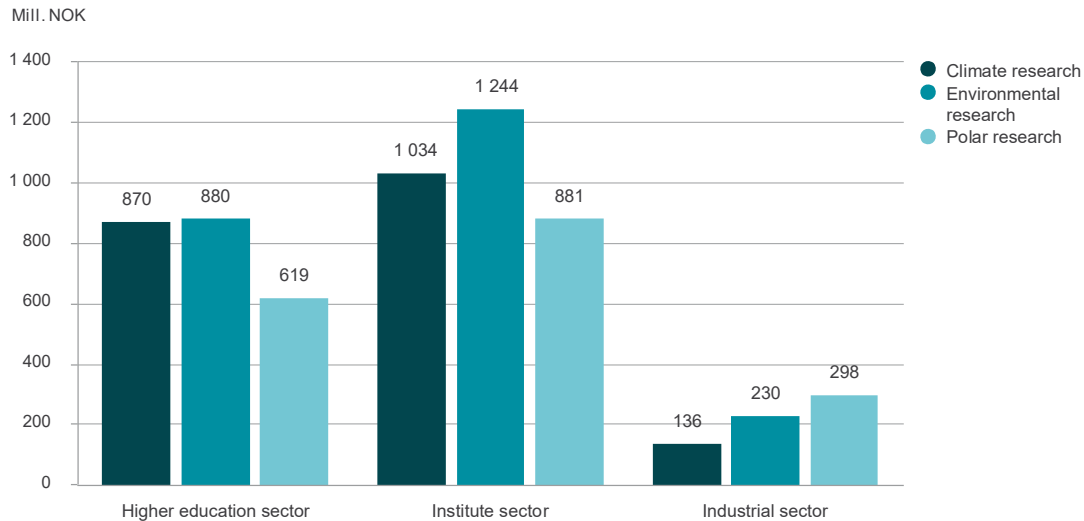
SINTEF, NIVA, Norwegian Veterinary Institute, Norwegian  
Institute of Public Health, Statistics Norway, NGI, STAMI,  
FAFO, Prio, NUPI, TØI, Norwegian Computing Center,  
NIFU, NIBR, NIKU, ISF, SIRUS, SIFO, NILF, Frisch centre,  
Norwegian Meteorological Institute, Cancer Registry of  
Norway, NKVTS, Knowledge Centre for the Health Services

FFI

IFE, Ostfold Research

Source: National R&D statistics

## 7 R&D expenditure for climate, polar and environmental research by sector of performance in 2014. Mill. NOK.



Source: NIFU/Statistics Norway, R&D statistics



**8** Total current expenditure and current expenditure<sup>1</sup> for R&D in Norway by type of health trust and health region. Current R&D expenditure as a percentage of total current expenditure. Per cent. 2014. Mill. NOK.

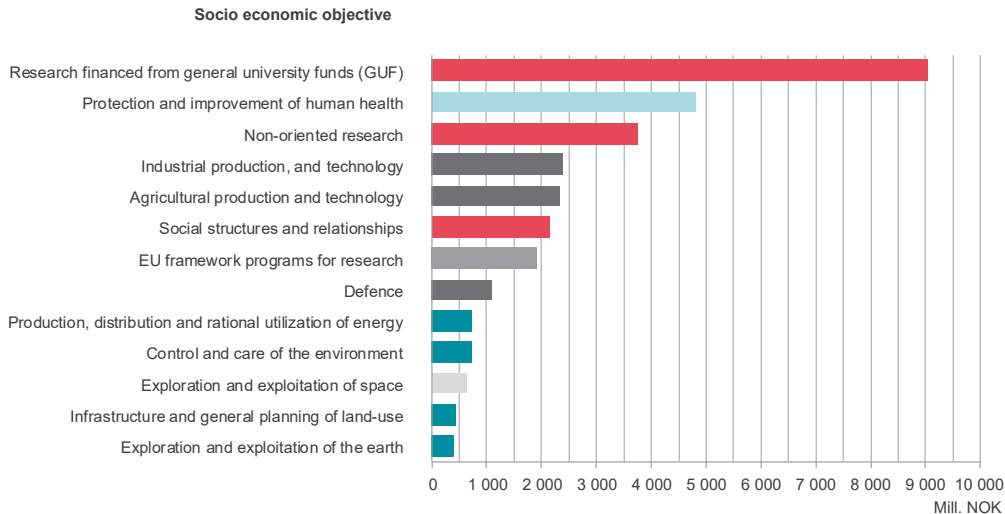
Health region	University hospital trusts <sup>2</sup>			Other hospital trusts		
	Total current costs <sup>3</sup>	Current costs for R&D <sup>3</sup>	% R&D	Total current expenditure <sup>3</sup>	Current expenditure for R&D <sup>3</sup>	% R&D
Mid Norway	7 776	242	3.1	7 421	45	0.6
Northern Norway	5 757	230	4.0	6 855	49	0.7
South-Eastern Norway	25 581	1 675	6.5	36 841	586	1.6
Western Norway	13 881	601	4.3	5 968	55	0.9
<b>Total</b>	<b>52 996</b>	<b>2 748</b>	<b>5.2</b>	<b>57 086</b>	<b>734</b>	<b>1.3</b>

<sup>1</sup> Current expenditure, including depreciation and externally funded R&D expenditure.

<sup>2</sup> Includes Oslo University Hospital HF, Akershus University Hospital HF, Bergen Health Trust HF, Stavanger Health Trust HF, St. Olav hospital HF and University Hospital Northern Norway HF.

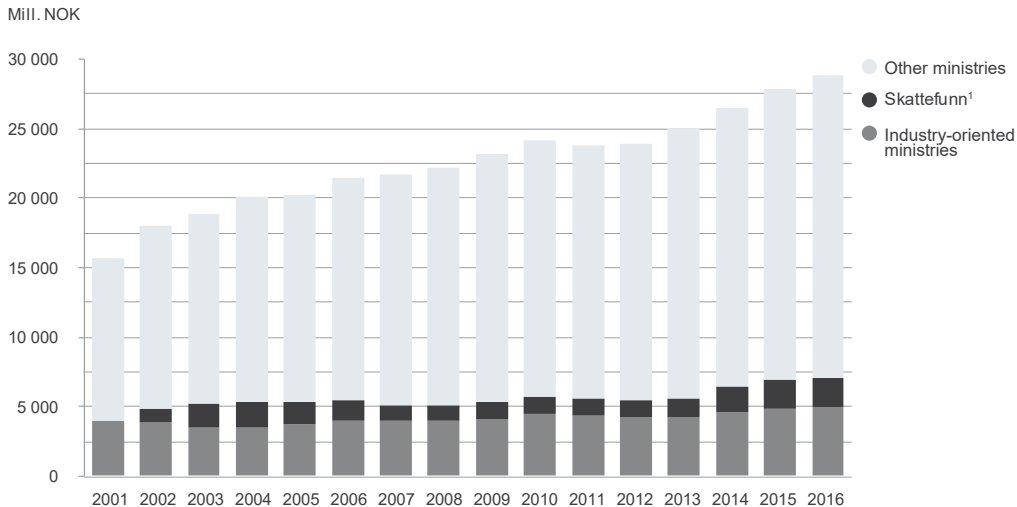
<sup>3</sup> Source: NIFU

## 9 Government budget appropriations or outlays for R&D (GBAORD) in Norway by socio-economic objective. 2015. Mill. NOK.



Source: NIFU

**10** Government budget appropriations or outlays for R&D (GBAORD) in Norway type of ministry and budget term. 2001–2016. Mill. NOK.



¹ SkatteFUNN is a tax deduction system for R&D.

Source: NIFU

**11** R&D personnel by type of institution in Norway. 2014.  
Head count and full time equivalents (FTE).

Type of institution	Head count by 01.10.2014			R&D full time equivalents	
	Total R&D personnel	Of which: Researchers/academic staff	Tech. & supp. staff	Total	Of which: Researchers/academic staff
<b>Industrial sector</b>	<b>28 153</b>	<b>18 180</b>	<b>9 973</b>	<b>17 932</b>	<b>12 284</b>
<b>Institute sector<sup>1</sup></b>	<b>10 812</b>	<b>7 491</b>	<b>3 321</b>	<b>8 681</b>	<b>6 289</b>
Of which: Research inst. serving enterprises	2 991	2 207	784	2 664	2 030
Research instit. serving government	7 821	5 284	2 537	6 017	4 259
<b>Universities and university colleges</b>	<b>26 849</b>	<b>20 090</b>	<b>6 759</b>	<b>10 664</b>	<b>8 885</b>
Of which: Universities	18 200	12 748	5 452	..	..
Spec. university institutions etc.	2 074	1 876	198	..	..
State university colleges	6 575	5 466	1 109	..	..
<b>Health trusts</b>	<b>6 133</b>	<b>4 263</b>	<b>1 870</b>	<b>3 019</b>	<b>1 780</b>
Of which: University hospital trusts	4 680	3 314	1 366	2 346	1 412
Other hospital trusts	1 453	949	504	673	368
<b>Total</b>	<b>71 947</b>	<b>50 024</b>	<b>21 923</b>	<b>40 297</b>	<b>29 237</b>

<sup>1</sup> Excluding hospitals.

Source: NIFU/Statistics Norway, R&D statistics

**12** Researchers/academic staff (head count) in Norway by type of institution: 2014. Doctorates and women.

Type of institution	Total			With a doctoral degree <sup>1</sup>			
	Total number	Women Number	%	Total Number	%	Women Number	%
<b>Industrial sector</b>	<b>18 180</b>	<b>4 084</b>	<b>22</b>	<b>2 123</b>	<b>12</b>	<b>506</b>	<b>12</b>
<b>Institute sector<sup>2</sup></b>	<b>7 491</b>	<b>3 068</b>	<b>41</b>	<b>3 846</b>	<b>51</b>	<b>1 460</b>	<b>48</b>
Of which: Research inst. serving enterprises	2 207	711	32	1 154	52	357	50
Research inst. serving government	5 284	2 357	45	2 692	51	1 103	47
<b>Universities and university colleges</b>	<b>20 090</b>	<b>9 413</b>	<b>47</b>	<b>9 074</b>	<b>45</b>	<b>3 544</b>	<b>38</b>
Of which: Universities	12 748	5 585	44	6 705	53	2 537	45
Spec. university institutions etc.	1 876	833	44	695	37	241	29
State university colleges	5 466	2 995	55	1 674	31	766	26
<b>Health trusts</b>	<b>4 263</b>	<b>2 160</b>	<b>51</b>	<b>2 133</b>	<b>50</b>	<b>942</b>	<b>44</b>
Of which: University hospital trusts	3 314	1 664	50	1 799	54	796	48
Other hospital trusts	949	496	52	334	35	146	29
<b>Total</b>	<b>50 024</b>	<b>18 725</b>	<b>37</b>	<b>17 176</b>	<b>34</b>	<b>6 452</b>	<b>34</b>

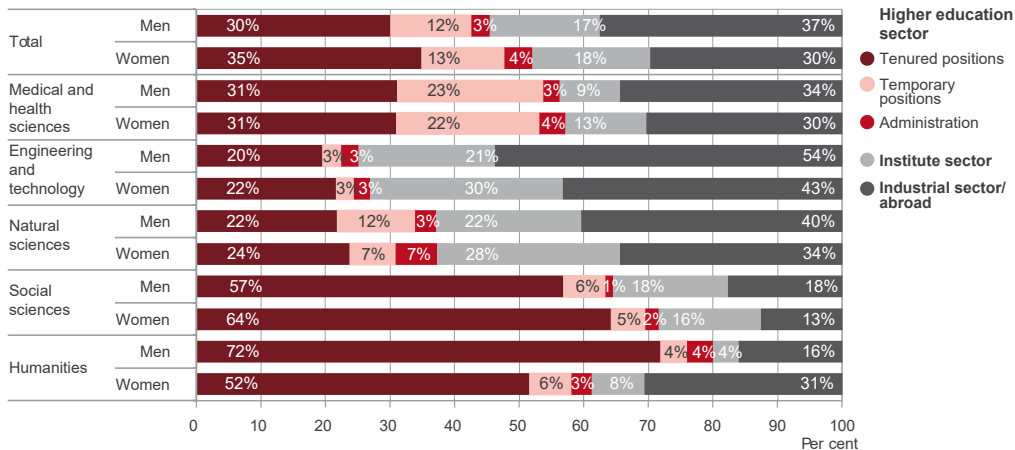
<sup>1</sup> Also includes licenciates.

<sup>2</sup> Excluding hospitals.

Source: NIFU/Statistics Norway, R&D statistics

### 13 Post doctors in Norway in 2001 and 2005 eight years after registration by type of position/sector, gender and field of science.<sup>1</sup> Per cent.

Field of science/Gender



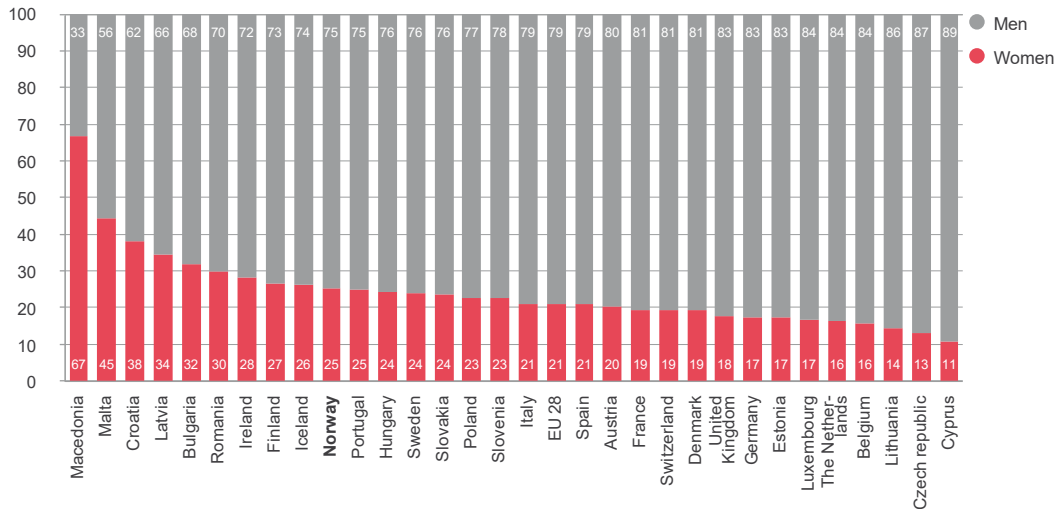
<sup>1</sup> Figures from the report *Employment situation for Norwegian post doctors in 2001 and 2005 after eight years, by gender and field of science* (<http://hdl.handle.net/11250/2357313>).

<sup>2</sup> Includes agricultural sciences.

Source: NIFU, Register of Research personnel

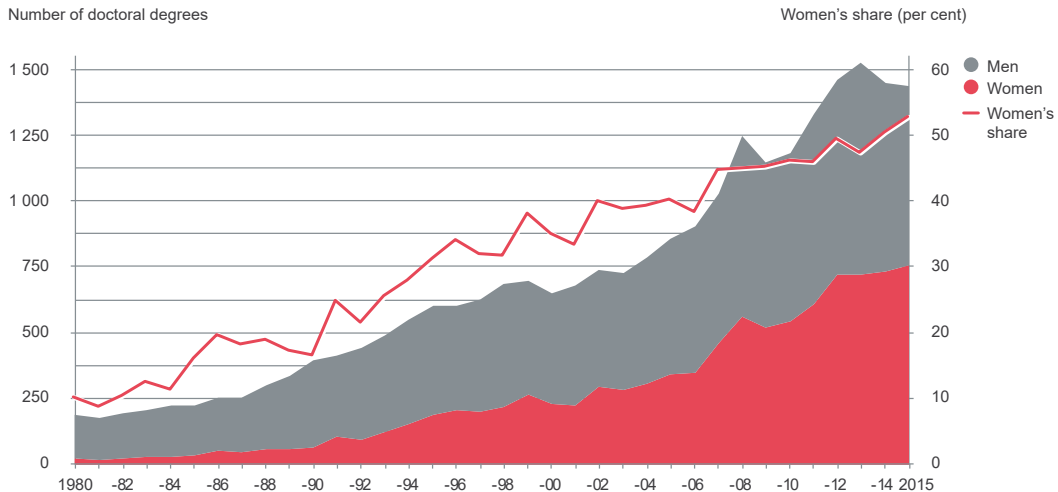
## 14 Gender balance among full professors (grade A personnel) in selected European countries. 2013. Per cent.

Per cent



Source: Eurostat She Figures 2015

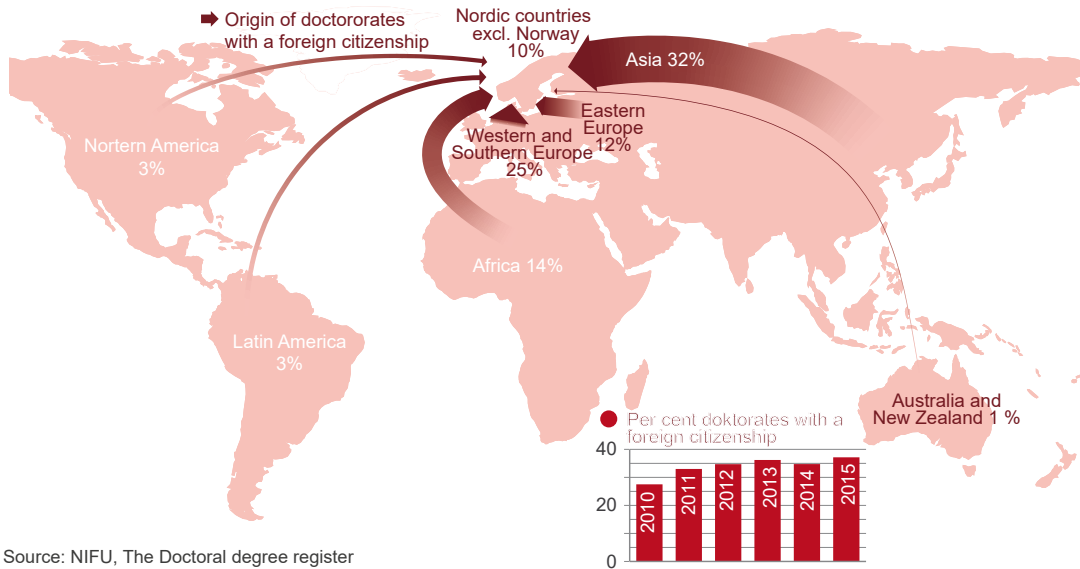
## 15 Awarded doctoral degrees in Norway by sex. 1980–2015.



Source: NIFU/The Doctoral degree register

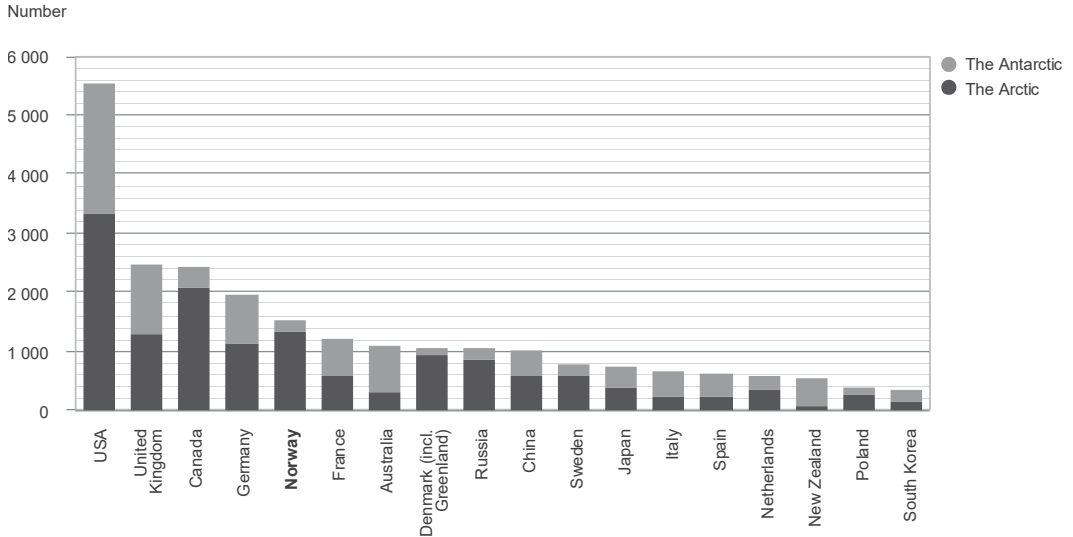


**16** Awarded doctoral degrees in Norway by citizenship. Region of origin. Per cent. 2010–2015.



Source: NIFU, The Doctoral degree register

## 17 Total number of polar research articles by country and polar region. 2012–2014.<sup>1</sup>

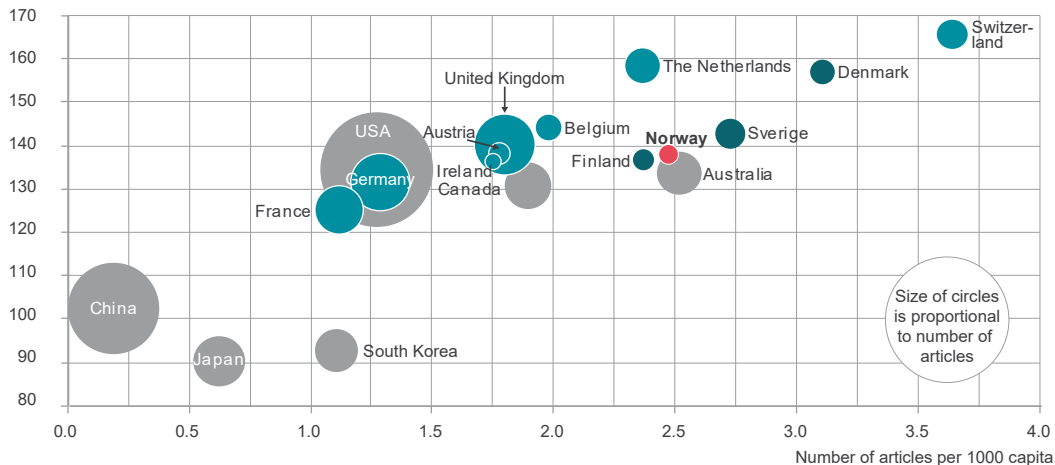


<sup>1</sup> The proportion of the world production is calculated using sum of all countries' production as denominator.

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

## 18 Number of articles per 1000 capita (2014) and relative citation index (2010–2013) for selected countries.

Relative citation index



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