

# R&D statistics 2006

**RANNÍS**



## Highlights of R&D statistics in Iceland

- R&D expenditure in Iceland in 2003 was 23,7 billion ISK (ca. 273 MEUR), amounting to 2,97% of GDP.
- Iceland is ranked 4th among OECD countries for R&D/GDP ratio.
- The private sector spent about 12 billion ISK (ca. 138 MEUR) on R&D in 2003. This constitutes about 52% of Iceland's gross expenditure on R&D (GERD), as compared to 60% in 2001.
- Around 44% of the total expenditure on R&D was financed by the private sector, 40% by the government and 15% from abroad, compared to 18% in 2001.
- Estimated gross expenditure on R&D for 2005 is about 29 billion ISK (ca. 37 MEUR) which constitutes around 3% of estimated GDP.
- Over 2.900 man-years were spent on R&D in 2003, involving some 5.500 individuals.
- Of all sectors, R&D expenditure was highest in the health sector in 2003 or 8,5 billion ISK. To compare, 3,5 billion ISK was spent on R&D in the fisheries and agriculture.

## RANNIS – The Icelandic Centre for Research

**RANNIS**, – The Icelandic Center for Research, was established by a legislation enacted in 2003 and replaced the office of the earlier Icelandic Research Council established by legislation in 1994. This in turn replaced earlier councils that trace their origins to a research council structure set up before the Second World War. The Icelandic Research Council was abolished by the legislation in 2003, and the Science and Technology Policy Council was established. The Council has 14 members representing the science and technology community and the social partners plus five ministers and is chaired by the Prime Minister.

**RANNIS** reports to the Ministry of Education, Science and Culture and its mission is to provide professional assistance to the preparation and implementation of science and technology policy in Iceland.

The main functions of **RANNIS** are the following:

- **RANNIS** operates the competitive financial public support system for research and technological development This includes the **Research Fund**, the **Fund for Research Equipment** and the **Graduate Education Fund** under the Ministry of Education, and the **Technology Development Fund** under the Ministry of Industry. Each of the funds is governed by a Board of Directors, the allocation of grants being subject to extensive peer review processes.
- **RANNIS** is actively providing the Science and Technology Policy Council and its subcommittees with information on scientific research and technology development nationally and internationally as a basis for the policy making process.
- **RANNIS** coordinates and promotes Icelandic participation in international cooperation in science and technology and interacts with corresponding agencies and research councils in other countries. **RANNIS** is the NCP-host organization for 6FP and 7FP that starts in 2007.

- **RANNIS** monitors the resource allocation and performance of R&D, evaluates the results of scientific research, technical development and innovation, and participates in international benchmarking of the results.
- **RANNIS** promotes public awareness of research and innovation in Iceland.

**RANNIS** serves the Icelandic science community across all fields of science and humanities.

The staff of **RANNIS** is a team of 21, including 15 professionals. **RANNIS** relies heavily on the involvement of external contacts in its operation. Around 70–80 working scientists and technical experts are co-opted to assist in the evaluation of grants applications and international contacts at any time on a rotating basis.

**RANNIS** runs its internal operation on an annual budget of about 1.9 MEUR, of which about 1.2 MEUR is allocated from the state budget and the rest emanates from service fees and contracts. In addition the main competitive funds operated by Rannis have the following EUR equivalent annual budgets (2005):

<b>Research Fund:</b>	6.7 MEUR
<b>Fund for Research Equipment:</b>	1.5 MEUR
<b>Technology Development Fund:</b>	4.5 MEUR
<b>Graduate Education Fund:</b>	0.8 MEUR
<b>Program for Nanotechnology and Postgenomics (2005–2009):</b>	1.2 MEUR

**RANNIS** thus handles a total turnover of around 17 MEUR a year.

Except for the Program for Nanotechnology and Postgenomics (2005–2009), the competitive funds operated by **RANNIS** operate horizontally across all fields of science, technology and innovation reaching from basic research to technological development and innovation, partly supporting infrastructure. The share of funds allocated to projects related to specific fields and disciplines will thus vary from year to year.

## **Research in Iceland**

### **Research and development statistics for 2006**

This booklet provides an abstract of research and development (R&D) statistics in Iceland and is based on the considerable database collected and collated by RANNIS and its predecessors (National Research Council and the Icelandic Research Council) since 1970. The collection and processing of the data have been organized in accordance with the procedures in the OECD's Frascati Manual. Furthermore, RANNIS enjoys active collaboration with Eurostat and various institutions in the Nordic countries. RANNIS' survey of R&D activities in Iceland is conducted every second year. In 2003 data was elicited from 1.200 businesses chosen from the Statistics Iceland database of firms exceeding four employees as well as public institutions involved in R&D. In addition to the R&D survey, RANNIS collects data on R&D from a number of external sources, e.g. commercial companies, public institutions, including institutions of applied industrial research, higher education and private non-profit organizations.

### **Other analysing and statistical activities**

RANNIS performs various statistical work other than the survey of R&D. One important area is the collation and processing of data on innovation among Icelandic companies, using information supplied by Statistics Iceland; this forms part of a European Project, CIS (Community Innovation Survey) conducted by Eurostat in collaboration with OECD. RANNIS also processes data in the field of education supplied by Statistic Iceland, the University of Iceland and others. Moreover, RANNIS collects data on publications and citations and on patent applications and grants. RANNIS currently intends to increase its involvement in the assessment and evaluation of research in various individual areas of science and industry. Staff from RANNIS plays an active part in collaborative Nordic and European projects in areas relating to statistics and policy-making in the sciences, technology, innovation and other aspects of the knowledge-based economy.

## What is research, development and innovation?

According to the Frascati manual (2002) R&D is 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. R&D covers three activities: basic research, applied research and experimental development.

**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.

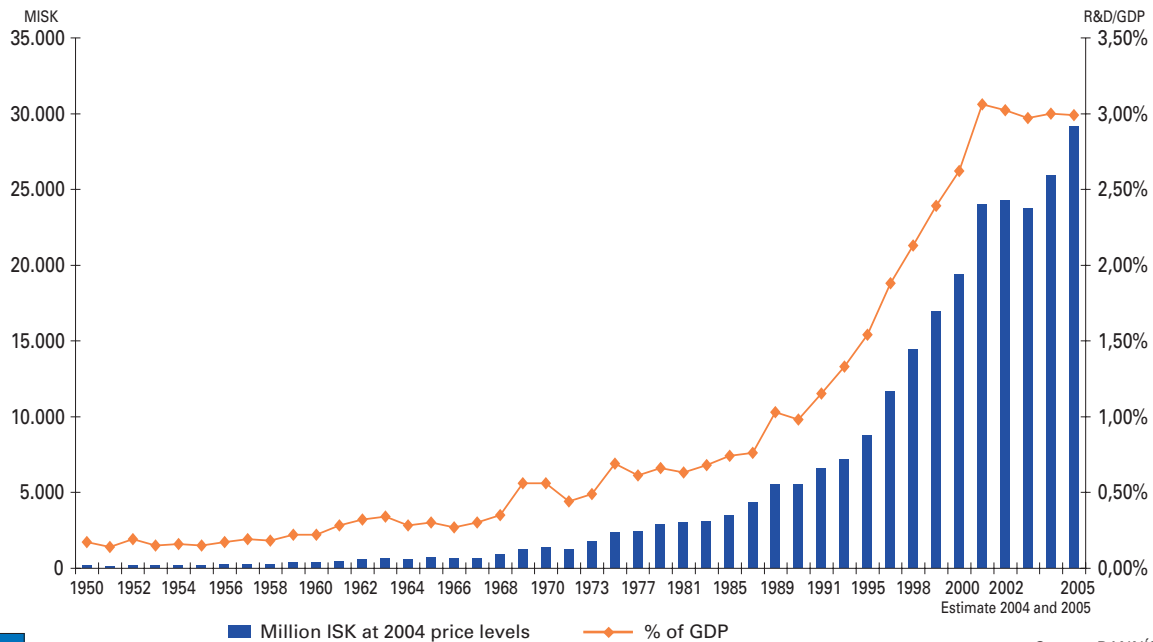
**Applied research** is original investigation undertaken to acquire new knowledge; it is directed primarily at a specific practical aim or objective.

**Experimental development** is systematic work, drawing on existing knowledge gained from research and practical experience, directed at producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

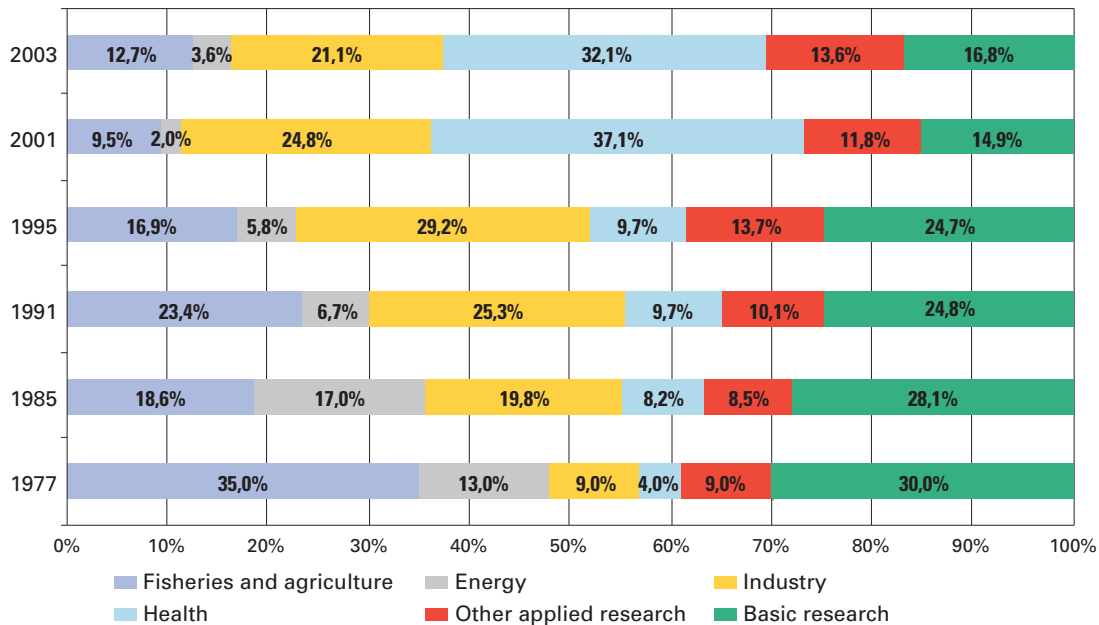
According to OECD's Oslo manual (2005) **innovation** is the implementation of a new or significantly improved product (goods or services), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.

Innovation is always at least new for the firm, but may also be new for the local environment or the world as a whole.

## R&D expenditure and its share in GDP 1950 to 2005 (at 2004 price levels)

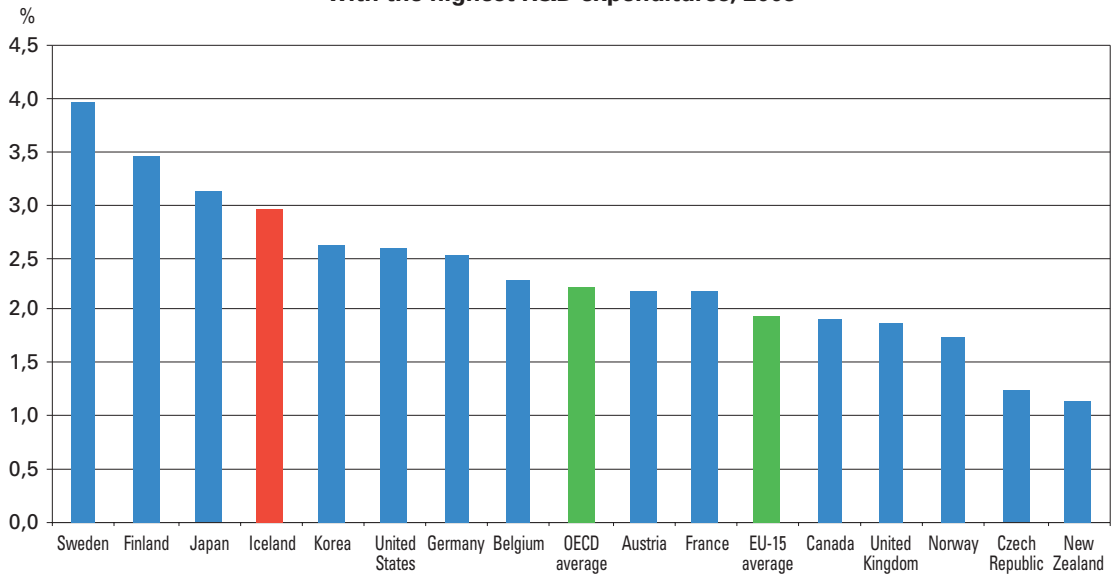


**Sectoral shares in R&D expenditure in selected years between 1977–2003 (%)**

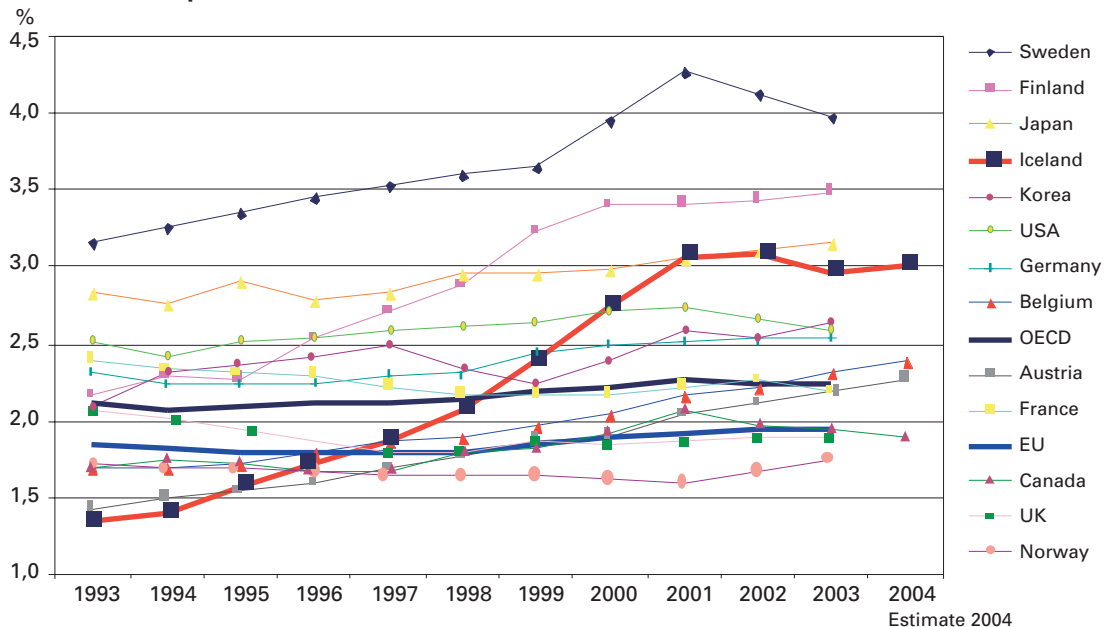




### R&D expenditure as a share (%) of GDP in OECD countries with the highest R&D expenditures, 2003



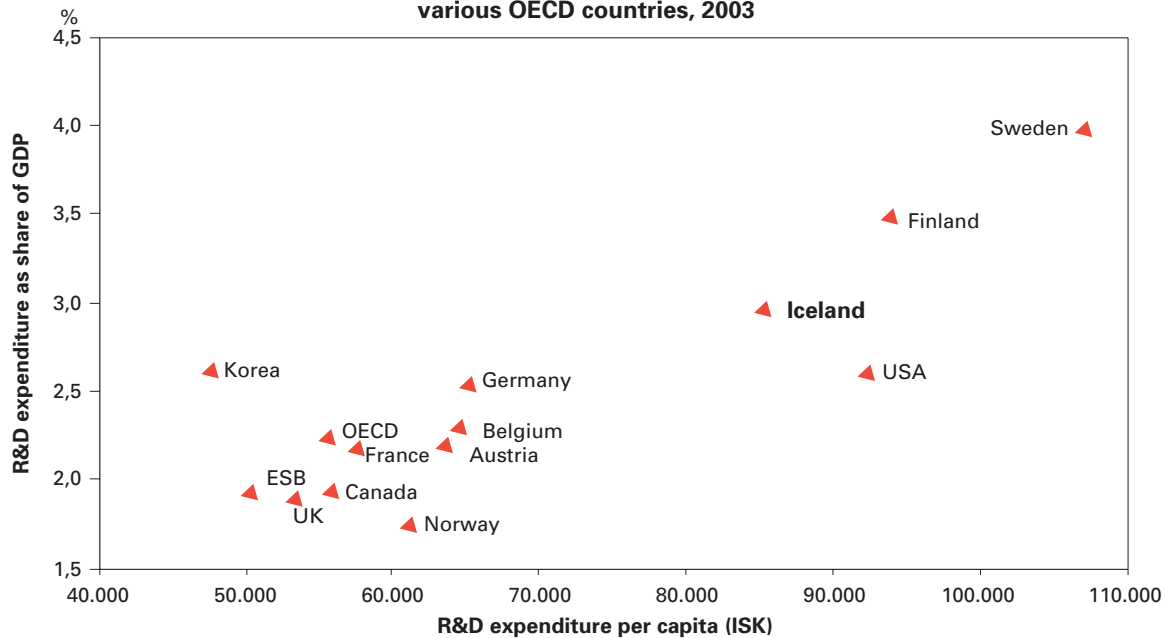
**R&D expenditure as a share (%) of GDP in various OECD countries 1993–2004**



**Total R&D expenditure by source of funding and performing organisation, 2003 (MISK).**

		Performing organizations								Total	%
		Business sector	%	Private non-profit	%	Public institutions	%	Higher education	%		
Funding	Business enterprise	9.402	76,6	20	3,9	508	8,6	478	9,5	<b>10.408</b>	<b>43,9</b>
	Private non-profit	–	–	149	29,4	64	1,1	143	2,8	<b>356</b>	<b>1,5</b>
	Public funding	477	3,9	294	58,0	4.830	82,1	3.917	77,5	<b>9.517</b>	<b>40,1</b>
	From abroad	2.398	19,5	44	8,0	481	8,2	515	10,2	<b>3.438</b>	<b>14,5</b>
	<b>Total</b>	<b>12.277</b>	<b>100,0</b>	<b>507</b>	<b>100,0</b>	<b>5.883</b>	<b>100,0</b>	<b>5.053</b>	<b>100,0</b>	<b>23.720</b>	<b>100,0</b>
	<b>%</b>	<b>51,8</b>		<b>2,1</b>		<b>24,8</b>		<b>21,3</b>		<b>100,0</b>	

**R&D expenditure per capita and R&D expenditure as a share of GDP in various OECD countries, 2003**



**R&D expenditure per capita in the Nordic countries, by sector (ISK) and  
R&D expenditure as a proportion of GDP, by sector (2003)**

<b>MISK – per person</b>	<b>Denmark</b>	<b>Finland</b>	<b>Iceland</b>	<b>Norway</b>	<b>Sweden</b>
Business sector	53.154	66.094	42.471	34.997	80.325
Public sector	5.192	9.090	20.342	9.196	3.774
Higher education	17.353	18.016	17.482	16.723	23.878
TOTAL	75.699	93.200	80.295	60.915	107.977
<b>% of GDP</b>	<b>Denmark</b>	<b>Finland</b>	<b>Iceland</b>	<b>Norway</b>	<b>Sweden</b>
Business sector	1,83	2,45	1,57	1,00	2,95
Public sector	0,18	0,34	0,76	0,26	0,14
Higher education	0,60	0,67	0,64	0,48	0,88
TOTAL	2,61	3,46	2,97	1,74	3,97
GDP (MISK)	15.673.673	14.044.616	811.199	15.908.354	24.385.140

### R&D personnel (man-years) by sector and researchers there of in 2003

<b>Total R&amp;D personnel</b>					
	<b>Denmark</b>	<b>Finland</b>	<b>Iceland</b>	<b>Norway</b>	<b>Sweden</b>
Business sector	28.912	31.861	1.355	16.126	48.113
Public sector	3.450	7.353	860	4.970	3.000
Higher education	10.695	17.486	728	7.918	21.495
<b>TOTAL</b>	<b>43.057</b>	<b>56.700</b>	<b>2.943</b>	<b>29.014</b>	<b>72.608</b>
<b>Researchers (there of)</b>					
	<b>Denmark</b>	<b>Finland</b>	<b>Iceland</b>	<b>Norway</b>	<b>Sweden</b>
Business sector	15.394	23.605	837	11.480	28.403
Public sector	2.344	4.710	519	3.258	2.287
Higher education	7.666	13.033	562	6.251	17.146
<b>TOTAL</b>	<b>25.404</b>	<b>41.348</b>	<b>1.918</b>	<b>20.989</b>	<b>47.836</b>

### Full-time equivalent (FTE) R&D work, by sector and occupations

		Pro- fessional	%	Technical assistance	%	Other support staff	%	TOTAL	%
Sector	Business sector	836,8	43,6	312,5	52,6	205,3	47,8	<b>1.354,6</b>	<b>46,0</b>
	Higher education	562,3	29,3	88,7	14,9	76,9	17,9	<b>727,9</b>	<b>24,7</b>
	Public sector	467,0	24,3	180	30,3	127,9	29,8	<b>774,9</b>	<b>26,3</b>
	Private non-profit	52,3	2,7	13,4	2,3	19,7	4,6	<b>85,4</b>	<b>2,9</b>
	<b>TOTAL</b>	<b>1.918,4</b>	<b>100,0</b>	<b>594,6</b>	<b>100,0</b>	<b>429,8</b>	<b>100,0</b>	<b>2.942,8</b>	<b>100,0</b>
%		<b>65,2</b>		<b>20,2</b>		<b>14,6</b>		<b>100,0</b>	

**Researchers in the Nordic countries (head count) in 1999, 2001 and 2003  
and share of women there of**

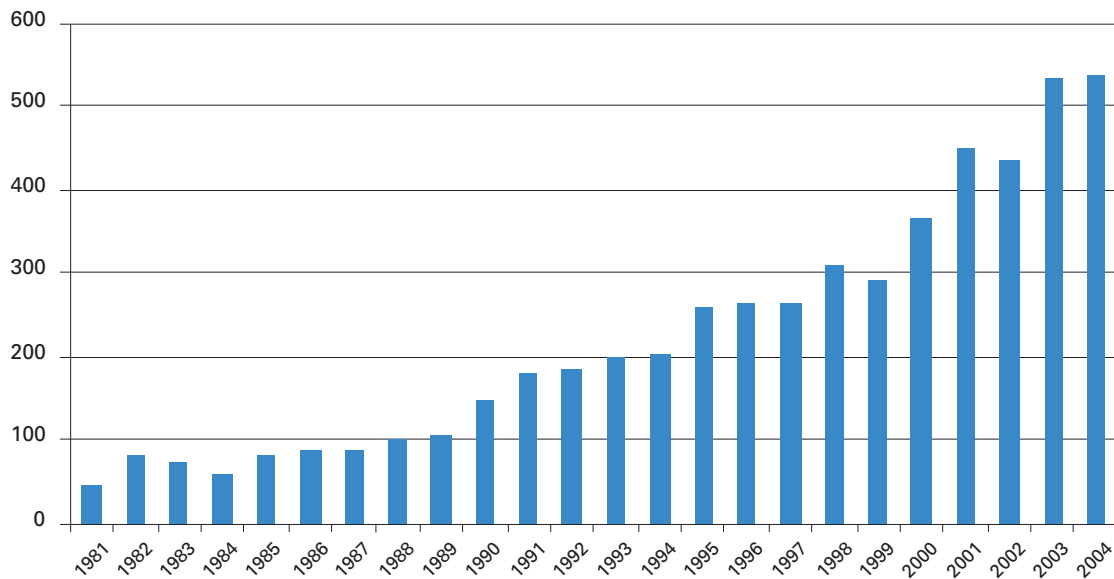
<b>Total researchers</b>			
	<b>1999</b>	<b>2001</b>	<b>2003</b>
Denmark	28.638	29.791	36.715
Finland	43.163	47.534	53.430
<b>Iceland</b>	<b>2.681</b>	<b>3.231</b>	<b>3.517</b>
Norway	30.961	34.864	35.700
Sweden	61.884	–	–
<b>Share of (%) women researchers</b>			
	<b>1999</b>	<b>2001</b>	<b>2003</b>
Denmark	26,8	28,0	28,4
Finland	28,6	29,1	29,8
<b>Iceland</b>	<b>34,1</b>	<b>34,7</b>	<b>39,4</b>
Norway	27,8	28,3	29,4
Sweden	–	–	–



## Publications and citations 1998–2002

	Total publication during the period	Publication per ten thousand, average per year	Citations per publication
Switzerland	67.453	18,5	6,0
Sweden	74.111	16,6	4,8
Denmark	37.942	14,1	5,3
Finland	35.550	13,5	4,7
UK	145.466	11,4	5,1
<b>Iceland</b>	<b>1.616</b>	<b>12,1</b>	<b>4,1</b>
Norway	24.375	10,9	4,4
Canada	166.504	10,8	5,0
USA	1.267.948	9,1	5,9
France	233.850	7,7	4,4
Germany	322.969	7,8	4,7
Japan	344.200	5,4	3,6

### Publications by Icelandic scientists 1981–2004



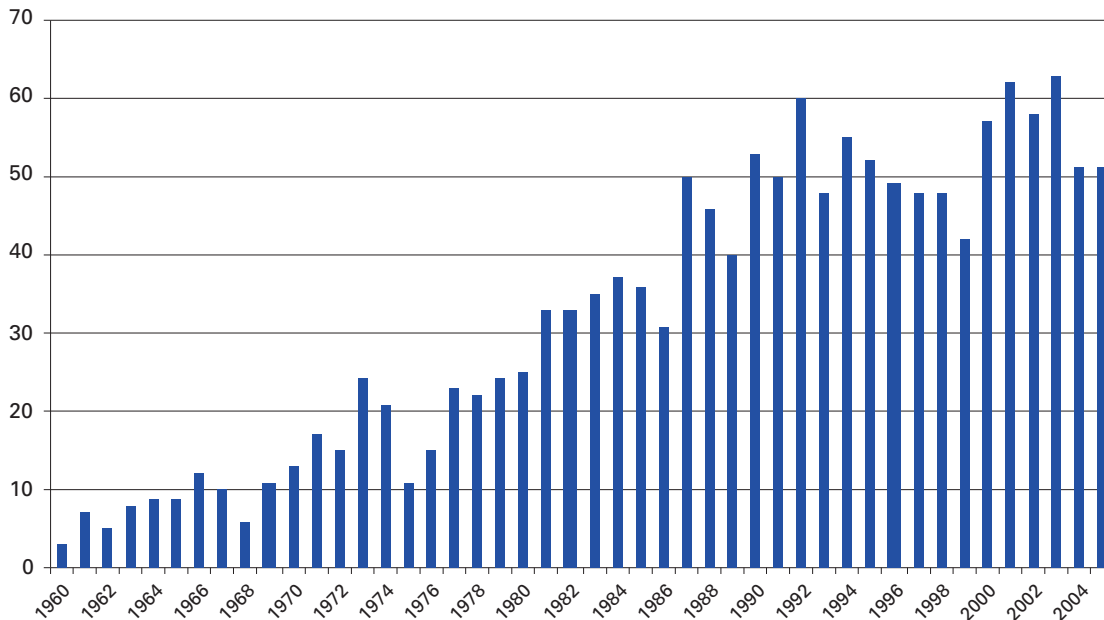
**Shares of population with higher education (age-group: 25–64)  
and engaged in life-long learning (2005)**

	Proportion of population aged 25-64 with higher education (%)	Proportion of population engaged in life-long learning (%)
Denmark	32,9	27,6
Finland	34,2	24,6
<b>Iceland</b>	<b>29,2</b>	<b>31,7</b>
Norway	32,3	19,1
Sweden	28,2	35,8
EU-25	21,9	10,7
Japan	37,4	–
USA	38,4	–

**Patent applications at the European Patent Office  
per million population 1991 and 2002**

	1991	2002
Switzerland	231,6	319,4
Germany	141,1	253,2
Finland	83,1	226,3
Netherlands	95,5	211,1
Sweden	107,1	208,5
Denmark	70,9	160,4
Japan	95,4	154,0
Austria	84,0	152,3
EU-15	73,0	126,9
Belgium	59,6	118,1
France	84,9	117,2
USA	68,9	98,3
<b>Iceland</b>	<b>39,7</b>	<b>95,6</b>
OECD	56,1	91,1
UK	60,2	87,8
Norway	40,6	79,7

## Graduations of Icelandic doctors in Iceland and abroad, 1960–2005



## Graduations of Icelandic doctors, by field, 1996–2005

Number of doctorate holders

