Research, Development and Innovation in Iceland

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Statistics on Research, Development and Innovation

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Contents

Rannis – The Icelandic Centre for Research

The Icelandic Centre for Research (Rannis) reports to the Ministry of Education, Science and Culture and operates according to the Act on Public Support for Scientific Research (No. 3/2003). Rannis supports research, innovation, education and culture in Iceland. Rannis administers competitive funds in the fields of research, innovation, education and culture, as well as strategic research programmes. Also, Rannis coordinates and promotes Icelandic participation in European programmes, such as Horizon 2020, Erasmus+ and Creative Europe. Rannis monitors resources and performance in R&D and promotes public awareness of research and innovation, education and culture in Iceland. Rannis has a permanent staff of 46 but also relies on the involvement of external contacts, including scientists and technical experts who assist in the evaluation of grant proposals. Rannis cooperates closely with the Icelandic Science and Technology Policy Council and provides professional assistance in the preparation and implementation of the national science and technology policy.

Icelandic statistics on research, development and innovation

This booklet provides an abstract of research and development (R&D) statistics in Iceland and is based on the extensive database that has been collected and collated by Rannis and its predecessors (the Icelandic Research Council and the National Research Council) since 1970. Previous booklets can be downloaded from the following website: www.rannis.is. The collection and processing of the data have been organised in accordance with the procedures in OECD's Frascati Manual. Furthermore, Rannis actively collaborates with Eurostat and various institutions in the Nordic countries. The Rannis survey of R&D activities in Iceland is conducted every other year. 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 organisations.

Other analysing and statistical activities
Rannis performs statistical work in a number of fields other than 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 the 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 instruments in various individual areas of science and industry. Researchers from Rannis play an active part in collaborative Nordic and European projects in areas relating to statistics and policy research in the sciences, technology, innovation and other aspects of the knowledge-based economy.

What are research, development and innovation?

Research and development (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.

* Frascati Manual, 2002.

What are research, development and innovation?

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

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

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. Innovation can be classified into four groups: product innovation, process innovation, marketing innovation and organisational innovation.

Product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended use. This includes significant improvements in technical specifications, components and materials; incorporated software; user friendliness; or other functional characteristics.

Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

** Oslo Manual, 2005.

Marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

Organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

Highlights

- The government appropriations to research and development, as stated in the national budget, in fixed 2014 prices amounted to 19 billion ISK (ca. 120 MEUR) in 2012 and 20,6 billion ISK (ca. 130 MEUR) in 2013. Approximately 45% of the contribution was allocated to the higher education sector and 26% went to various public institutions.
- In 2013, public competitive funding of research and development was a sum of 3,6 billion ISK (ca. 23 MEUR). Icelandic companies received refunding amounting to 1,1 billion ISK (ca. 7 MEUR) via the tax incentives scheme for innovation companies.
- The European Union, in 2007 to 2013, allocated approximately 10 billion ISK to Icelandic partners participating in the 7th Framework Programme.
- In 2010, 7,7% of the Gross Domestic Product in Iceland was allocated to educational institutions, this share is a little over the OECD average. Icelanders allocate relatively less to tertiary education and relatively more to primary, secondary and post-secondary education compared to other OECD countries.
- 34% of Icelanders, 25 to 64 years old, have completed tertiary education. This is a little above the OECD average which depicts that 32% of people in this age range have some tertiary education.
- In 2012, 93 Icelanders attained a doctorate degree. Women were the majority of graduates (54%).
- In 2011, R&D expenditure in Iceland amounted to 42,4 billion ISK (ca. 269 MEUR). As a share of the Gross Domestic Product (GDP), R&D expenditure accounted for 2,6%.
- Iceland is ranked 10th among OECD countries for the R&D/GDP ratio.
- Of all sectors, R&D expenditure was highest in the health sector and within the manufacturing industry in 2011.
- In 2011, 48% of the total expenditure on R&D was financed by the private sector, 42% by the government, 2% from higher education and private non-profit organisations and 8% of the funding came from abroad.

Highlights

- In total, 3.244 full time equivalents (FTE) performed R&D in Iceland in 2011. Most of the FTE's (46%) were performed within the private sector.
- 70% of the FTE's were performed by researchers and mostly men performed the R&D.
- 64% of Icelandic firms with at least ten employees took part in innovative activities during 2008 to 2010.
- Iceland has shown the largest increase in the publication of articles in peer reviewed journals in relative terms from 2000 to 2012. The relative growth of other Nordic countries has been considerably lower. These are publications that originate from selected Nordic universities and university hospitals.
- The number of Icelandic patent applications to the European Patent Office has increased by 26% in a 12 year period, from 13,7 applications per hundred thousand inhabitants in 2001 to 18,4 applications in 2012.

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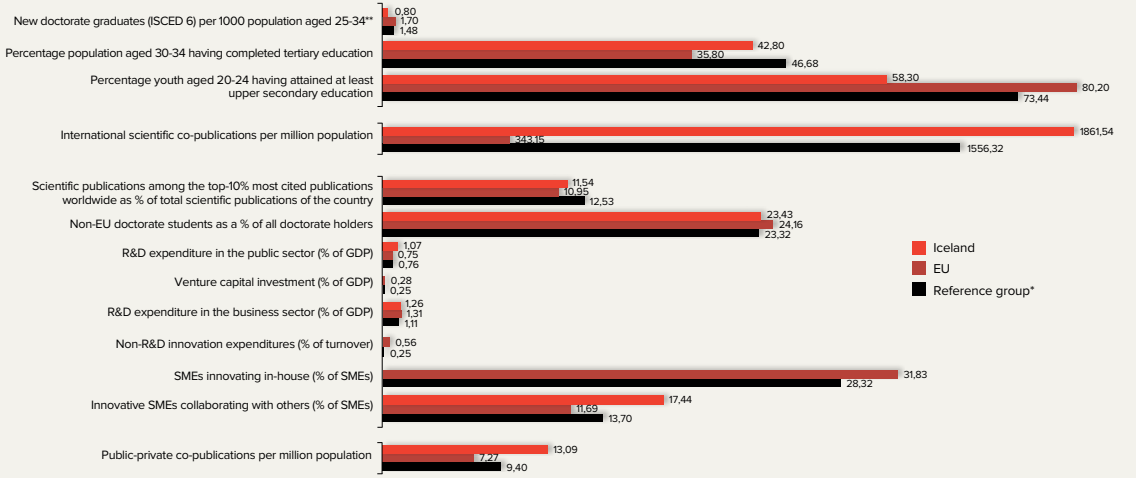
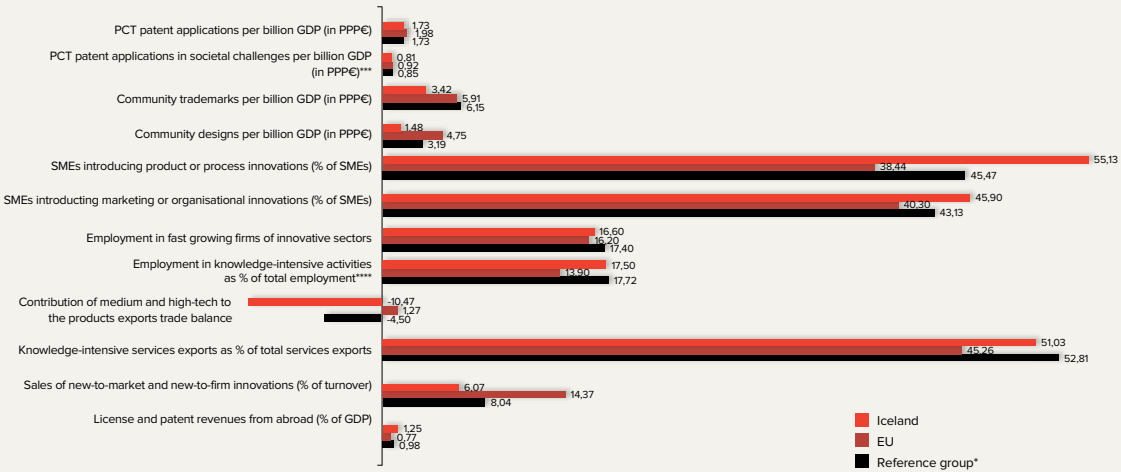
Overview of research, development and innovation in Iceland in 2014

Figure 1. Overview of research, development and innovation in Iceland in 2014.





Source: Innovation Union Scoreboard 2014. The sources date back to 2009 to 2012, an emphasis is placed on publishing the most recent data.

* The reference group comprises Ireland, Luxembourg, the Netherlands, Iceland and Norway.

** The statistics on new doctoral graduates only include graduations from Icelandic universities and no graduations of Icelanders abroad.

*** Patent applications in societal challenges refer to the number of PCT patent applications in climate change mitigation and health. Patents in climate change mitigation equal those in renewable energy, electric and hybrid vehicles and energy efficiency in buildings and lighting. Patents in health-related technologies include those in medical technology.

**** Knowledge-intensive activities are defined, based on EU Labour Force Survey data, as all ISAT industries at 2-digit level where at least 33% of employment has a higher education degree (ISCED5 and ISCED6).

Table 1. Government appropriations to research and development by source of funding in million ISK in fixed 2014 prices from 2011 to 2014.*

	2011		2012		2013		2014**	
	R&D of total contribution	Percentage	R&D of total contribution	Percentage	R&D of total contribution	Percentage	R&D of total contribution	Percentage
Ministry of Industries and Innovation	4.940	26,4	5.293	27,6	5.338	25,9	4.874	25
Ministry of Finance and Economic Affairs	34	0,2	34	0,2	45	0,2	13	0,1
Prime Minister's Office	16	0,1	2	0	1	0	101	0,5
Ministry of the Interior	223	1,2	208	1,1	339	1,6	362	1,9
Ministry of Education, Science and Culture	11.140	59,6	11.322	59	12.565	60,9	11.821	60,6
Ministry for the Environment and Natural Resources	1.236	6,6	1.209	6,3	1.242	6	1.204	6,2
Ministry for Foreign Affairs	34	0,2	21	0,1	27	0,1	30	0,2
Ministry of Welfare	1.081	5,8	1.102	5,7	1.089	5,3	1.100	5,6
Total	**18.704**	**100**	**19.189**	**100**	**20.645**	**100**	**19.505**	**100**

Source: Rannis.
*Original sources: Government accounts for 2009-2012, the national budget for 2013 and the draft budget for 2014.
** The 2014 prices are based on prices in the 2014 draft budget.

Table 2. Government appropriations to research and development by recipient in million ISK in fixed 2014 prices from 2011 to 2014.*

	2011		2012		2013		2014**	
	R&D of total contribution	Percentage	R&D of total contribution	Percentage	R&D of total contribution	Percentage	R&D of total contribution	Percentage
International organisations and the 7th Framework Programme	977	5,2	1.075	5,6	1.198	5,8	1.337	6,9
Universities and university institutions	8.454	45,2	8.615	44,9	9.086	44	8.744	44,8
Public organisations	4.749	25,4	5.076	26,5	4.946	24	5.126	26,3
Competitive funds	3.879	20,7	3.879	20,2	4.781	23,2	3.814	19,6
Various R&D projects	646	3,5	543	2,8	634	3,1	485	2,5
Total	**18.704**	**100**	**19.189**	**100**	**20.645**	**100**	**19.505**	**100**

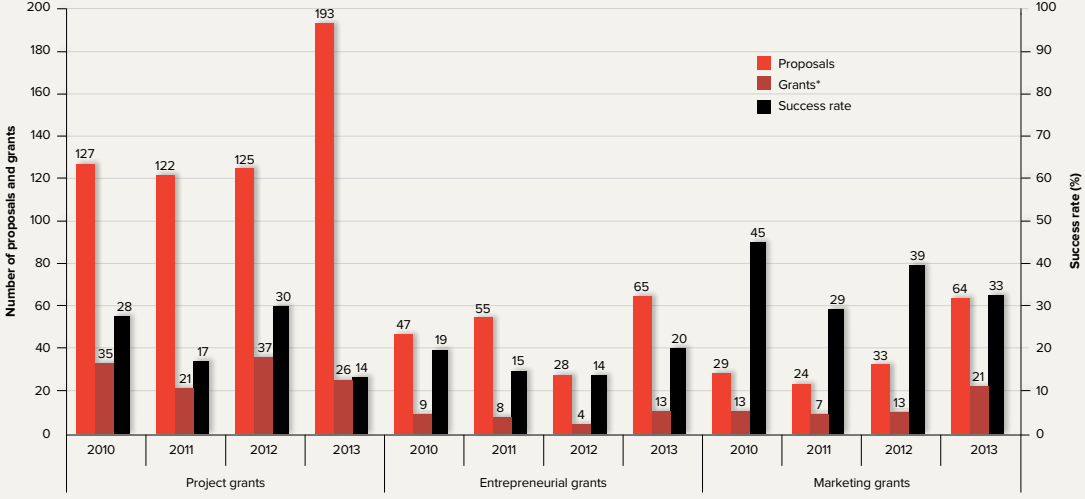
Source: Rannis.
*Original sources: Government accounts for 2009-2012, the national budget for 2013 and the draft budget for 2014.
** The 2014 prices are based on prices in the 2014 draft budget.

Table 3. Public competitive funding of research and development, tax incentive for innovation companies and EU's 7th Framework Programme in million ISK in fixed 2014 prices from 2009 to 2014.*

	2009	2010	2011	2012	2013	2014**
Icelandic Research Fund***	983	982	907	819	1.351	1.185
Research Fund for Graduate Students	120	115	103	103	98	
Technology Development Fund	807	1.037	782	830	1.309	983
Strategic Research Programme for Science and Technology	394	491	267	208	406	193
Infrastructure Fund / Equipment Fund	405	184	174	225	110	106
Total of funds administered by Rannis	**2.709**	**2.809**	**2.233**	**2.185**	**3.274**	**2.467**
Research Fund for Increased Value in Fisheries	414	249	449	304	257	164
Other research and development funds	62	57	584	572	112	100
Tax incentive for innovation companies****			614	818	1.139	1.084
EU's 7th Framework Programme	1.358	781	818	972	926	1.038
Total	**4.543**	**3.895**	**4.698**	**4.851**	**5.708**	**4.853**

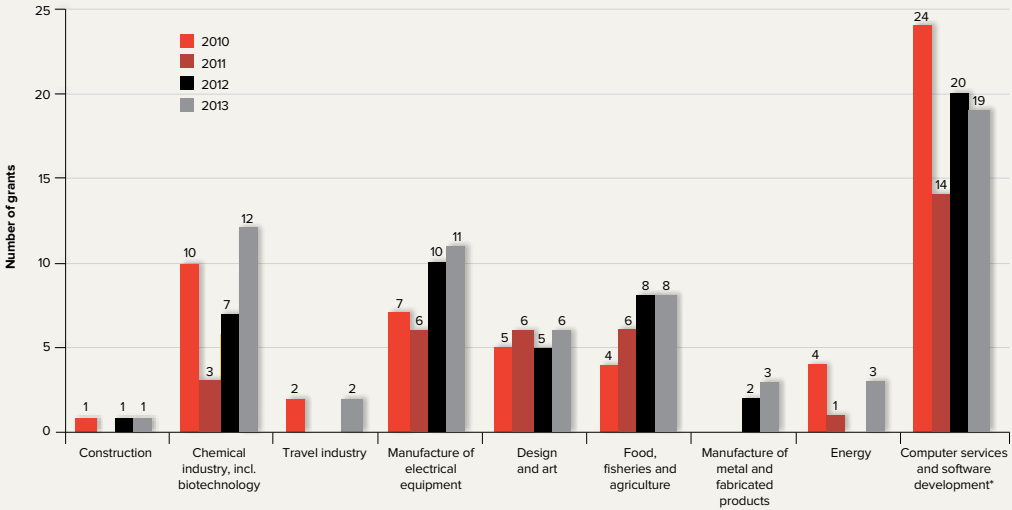
Source: Rannis.
*Original sources: Government accounts for 2009 - 2012 and the national budget for 2013 and 2014.
** The 2014 prices are based on prices in the 2014 draft budget.
*** The Research Fund for Graduate Students was discontinued in 2013. Funding for graduate students became available from the Icelandic Research Fund as of 2014.
****Established in 2009. Refunding first took place in 2011 regarding R&D costs in 2010.

Figure 2. New proposals and grants from the Technology Development Fund by type of grant from 2010 to 2013.



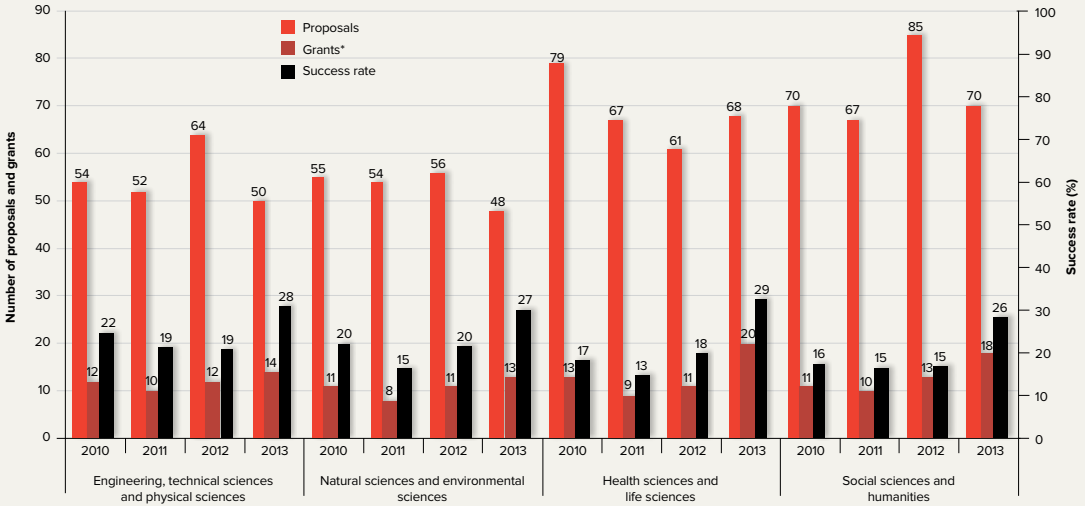
Source: Rannis.
* In 2010, grant amounts were on average 6,4 million ISK (ca. 41 thousand EUR). In 2013, grant amounts were on average 10,5 million ISK (ca. 67 thousand EUR).

Figure 3. Number of grants from the Technology Development Fund by industrial classification from 2010 to 2013.



Source: Rannis.
* Computer services and software development overlap to some extent with other categories, such as manufacture of electrical equiment.

Figure 4. New proposals and grants from the Icelandic Research Fund by fields of science from 2010 to 2013.



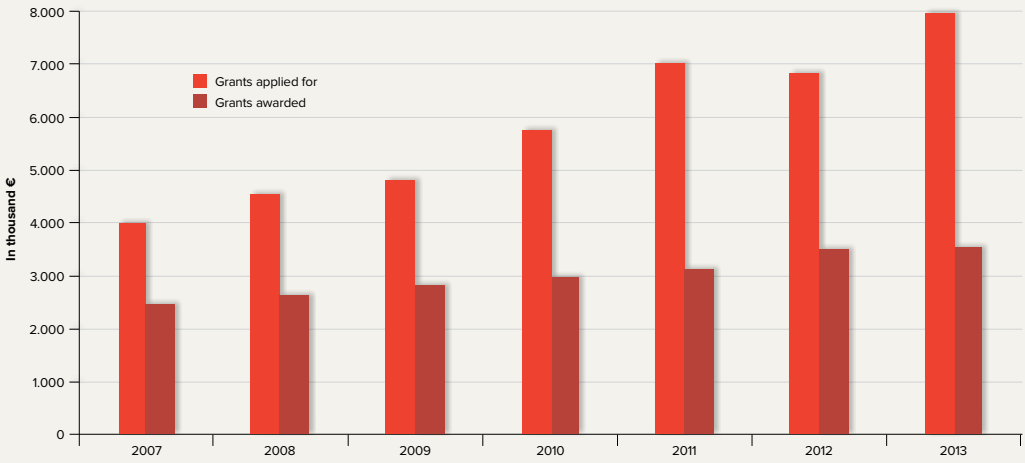
Source: Rannis.
* In 2010, grant amounts were on average 5,8 million ISK (ca. 37 thousand EUR). In 2013, grant amounts were on average 6,4 million ISK (ca. 41 thousand EUR).

Table 4. Overview of Icelandic participation in the EU's 7th Framework Programme from 2007 to 2013.

Thematic Area	Icelandic participation*	Number of funded projects with Icelandic participants	Number of applications with Icelandic participants	Success rate (%)	EU contribution to Icelandic participants in million €	Total EU contribution to projects with Icelandic participation in million €
Health	30	27	73	37,0	18,5	176,4
Food, Agriculture, and Biotechnology	30	21	106	19,8	6,9	109,3
Information and Communication Technologies	13	13	125	10,4	2,7	42,3
Nanosciences, Nanotechnologies, Materials and New Production Technologies	6	6	25	24,0	0,7	15,8
Energy	12	7	17	41,2	3,9	28
Environment (including Climate Change)	23	19	59	32,2	6,1	101,7
Transport (including Aeronautics)	5	5	26	19,2	0,6	8,9
Socio-economic Sciences and Humanities	8	8	46	17,4	0,8	20,2
Space	4	4	8	50,0	0,3	6
Security	3	2	13	15,4	0,6	13
General Activities (Annex IV)	1	1	1	100,0	0,0	4
Joint Technology Initiatives (Annex IV-SP1)*	6	6	14	42,9	4,6	75,1
European Research Council	1	1	42	2,4	2,4	2,4
Marie-Curie Actions	48	44	188	23,4	11,8	61,3
Research Infrastructures	13	12	15	80,0	0,9	63,6
Research for the Benefit of SMEs	35	18	94	19,1	4,5	26,3
Regions of Knowledge	0	0	6	0,0	-	0
Science in Society	5	5	26	19,2	0,5	5,9
Coherent Development of Research Policies	2	2	3	66,7	0,2	2
Total	**245**	**201**	**887**	**22,7**	**66**	**762,2**

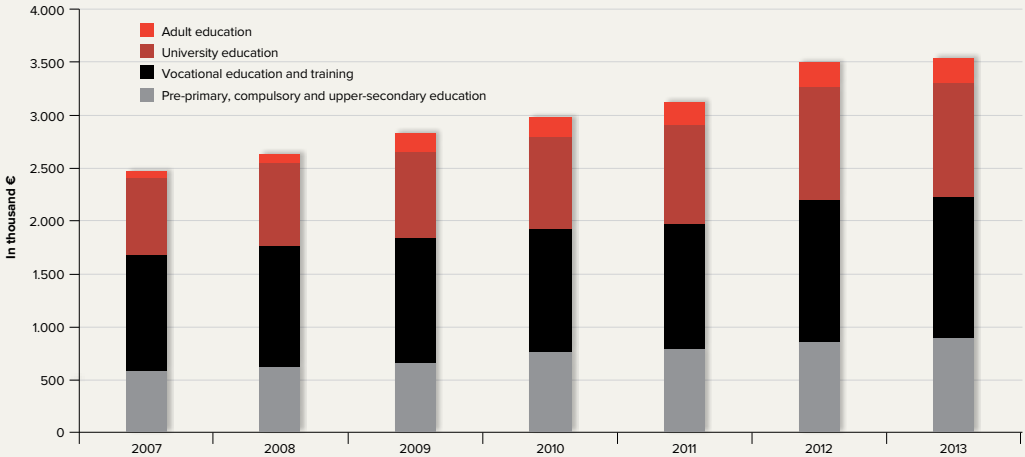
Source: E-CORDA. The statistics are based on data available in October 2013 and do not reflect the overall results of Iceland's participation in the FP.
*Icelandic participation reflects the number of instances an Icelandic participant takes part in a project. It is not a count of Icelandic participants

Figure 5. Overview of Icelandic participation in the EU's Lifelong Learning Programme in thousand euros from 2007 to 2013.



Source: Rannis

Figure 6. Overview of Icelandic participation in the EU's Lifelong Learning Programme by all education and training sectors in thousand euros from 2007 to 2013.



Source: Rannis

Table 5. Expenditure on educational institutions as a percentage of GDP by level of education in 2010.

	Primary, secondary and post-secondary non-tertiary education	Tertiary education	Total all levels of education*	Tertiary education as a share of total education
Belgium	4,4	1,4	**6,6**	**22%**
Canada	3,9	2,7	**6,6**	**41%**
Denmark	4,8	1,9	**8,0**	**24%**
Finland	4,1	1,9	**6,5**	**30%**
France	4,1	1,5	**6,3**	**24%**
Iceland	**4,9**	**1,2**	**7,7**	**16%**
Ireland	4,8	1,6	**6,4**	**24%**
Netherlands	4,1	1,7	**6,3**	**28%**
Norway	5,1	1,7	**7,6**	**22%**
OECD average	3,9	1,6	**6,3**	**26%**
Slovenia	3,9	1,3	**5,9**	**21%**
Sweden	4,0	1,8	**6,5**	**27%**
Switzerland	4,0	1,3	**5,6**	**23%**
United Kingdom	4,8	1,4	**6,5**	**21%**
United States	4,0	2,8	**7,3**	**38%**

Source: OECD, Education at a Glance, 2013.
*Expenditure on preschool education is included in the section showing total levels of education.

Table 6. Percentage of the population that has attained tertiary-type B education or tertiary-type A and advanced research programmes, by age group, in 2011.

	Tertiary-type B education (%)*						Tertiary-type A and advanced research programmes (%)						Total tertiary (%)						Total tertiary in thousands
Age	25-64	30-34	25-34	35-44	45-54	55-64	25-64	30-34	25-34	35-44	45-54	55-64	25-64	30-34	25-34	35-44	45-54	55-64	25-64
Belgium	18	21	19	20	17	14	17	22	23	19	14	11	35	43	42	39	31	25	2.041
Canada	25	27	26	26	25	21	27	31	31	32	23	22	51	58	57	58	48	43	9.677
Denmark	6	6	5	6	6	5	28	35	33	31	26	23	34	41	39	37	31	28	953
Finland	14	3	2	17	22	17	25	43	38	30	19	15	39	46	39	47	41	31	1.132
France	11	17	16	14	9	7	18	27	27	21	13	12	30	43	43	36	22	19	9.711
Iceland	**4**	**–****	**3**	**5**	**4**	**4**	**30**	**41**	**37**	**34**	**27**	**20**	**34**	**41**	**39**	**39**	**31**	**24**	**55**
Ireland	15	18	16	18	13	10	23	32	31	26	18	13	38	49	47	43	31	23	904
Netherlands	3	3	2	3	3	2	30	38	38	31	27	24	32	41	40	34	29	26	2.852
Norway	2	2	1	2	3	3	36	48	46	39	31	26	38	50	47	42	34	29	973
OECD average	10	10	10	11	10	8	23	30	30	25	19	17	32	39	39	34	28	24	–
Slovenia	11	14	13	12	12	9	14	24	21	16	10	8	25	38	34	28	22	16	298
Sweden	9	8	9	9	9	10	26	40	34	31	21	18	35	48	43	39	31	28	1.702
Switzerland	11	11	9	12	12	9	25	32	30	28	22	18	35	44	40	39	33	27	1.545
United Kingdom	10	8	8	11	12	9	30	40	39	32	24	22	39	48	47	43	36	31	12.958
United States	10	10	10	10	11	10	32	34	33	34	30	31	42	44	43	45	41	41	68.921

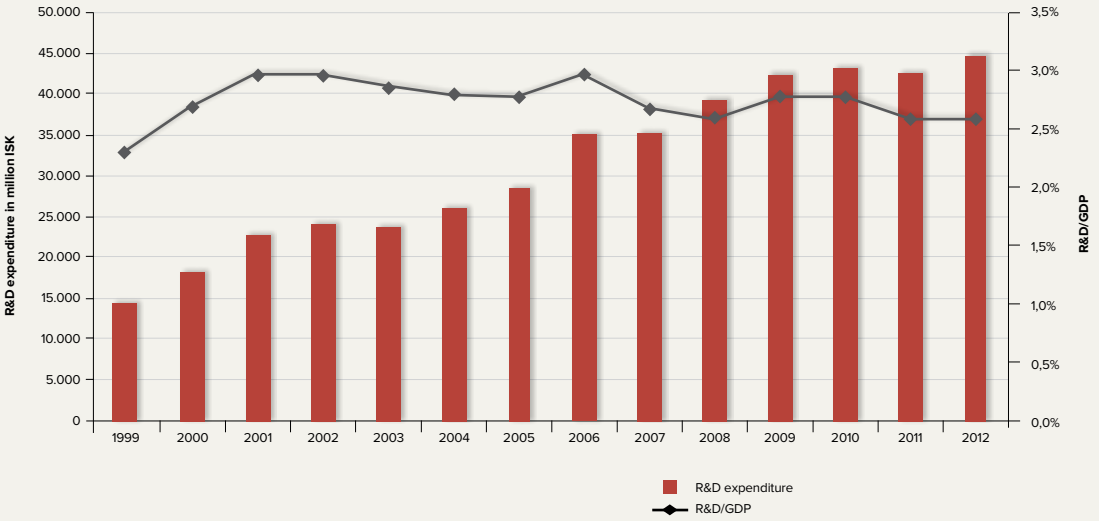
Source: OECD, Education at a Glance, 2013.
*Tertiary-type B programmes (ISCED 5B) are typically shorter than those of tertiary-type A and focus on practical, technical or occupational skills for direct entry into the labour market, although some theoretical foundations may be covered in the respective programmes. They have a minimum duration of two years full-time equivalent at the tertiary level.
**There are too few observations to provide a reliable estimate.

Table 7. Number of doctoral degrees in the Nordic countries from 2007 to 2012.

		2007	2008	2009	2010	2011	2012
Denmark	**Total**	**1.072**	**1.138**	**1.239**	**1.428**	**1.571**	**1.630**
	Per million population	**196**	**207**	**224**	**257**	**282**	**292**
	Women	449	478	570	637	711	753
	Men	623	660	669	791	860	877
Finland	**Total**	**1.526**	**1.526**	**1.642**	**1.518**	**1.653**	**1.649**
	Per million population	**289**	**287**	**308**	**283**	**308**	**305**
	Women	772	831	861	797	850	842
	Men	754	695	781	721	803	807
Iceland*	**Total****	**69**	**80**	**73**	**88**	**103**	**93**
	Per million population	**224**	**254**	**229**	**277**	**323**	**291**
	Women	36	33	41	44	48	50
	Men	33	47	32	44	55	43
Norway	**Total**	**1.030**	**1.245**	**1.148**	**1.185**	**1.329**	**1.461**
	Per million population	**219**	**261**	**238**	**242**	**267**	**291**
	Women	459	560	518	545	610	722
	Men	571	685	630	640	719	739
Sweden	**Total**	**2.853**	**2.914**	**2.722**	**2.614**	**2.593**	**2.535**
	Per million population	**312**	**316**	**293**	**279**	**275**	**266**
	Women	1.352	1.375	1.382	1.309	1.275	1.202
	Men	1.501	1.539	1.340	1.305	1.318	1.333

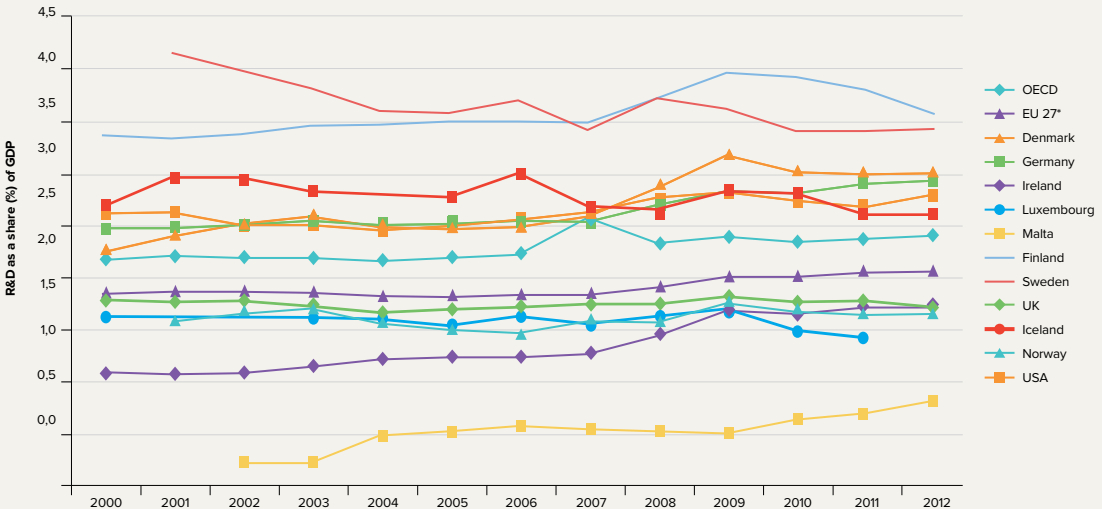
Source: Norbal.
*Icelanders attaining doctoral degrees abroad accounted for. Doctoral degrees from abroad are not included in the statistics for the other Nordic countries.
**Data for Iceland was updated and corrected in January 2014.

Figure 7. Total R&D expenditure as a percentage of Gross Domestic Product (GDP) in each year prices from 1999 to 2012.*



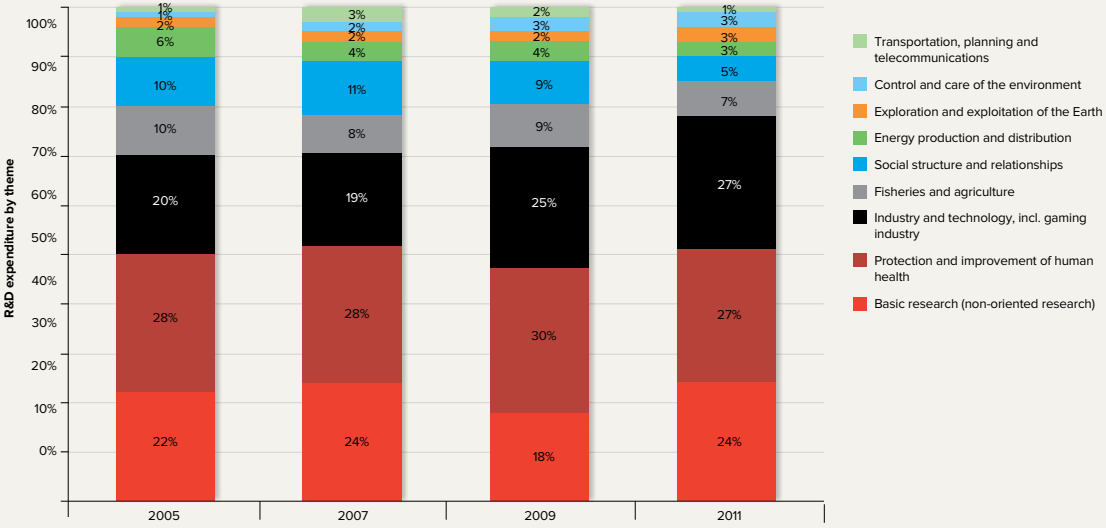
Source: Rannis and Statistics Iceland.
*Statistics for even years are estimates.

Figure 8. R&D expenditure as a share (%) of GDP in various OECD countries from 2000 to 2012.



Source: Rannis and OECD, Main Science and Technology Indicators and Eurostat.
* The 27 EU member states as of January 1st, 2007.

Figure 9. R&D expenditure by theme from 2005 to 2011.



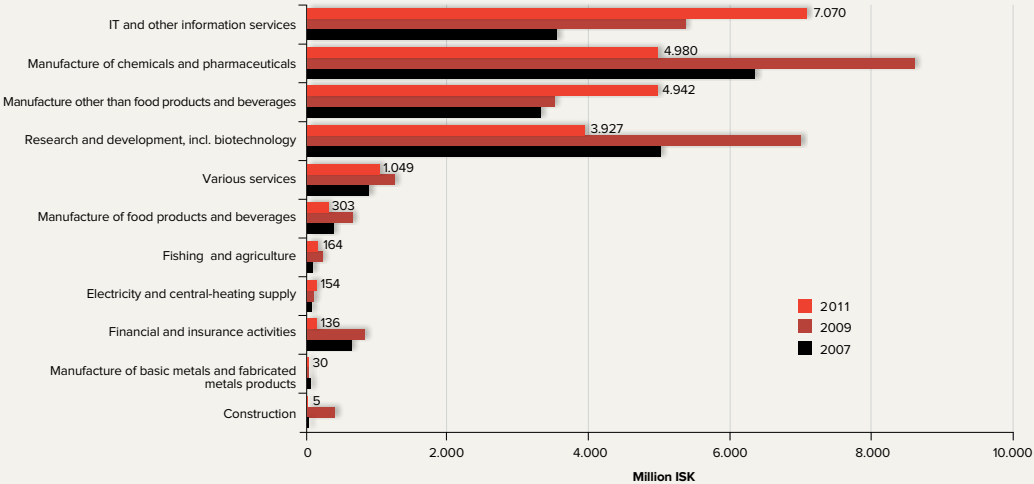
Source: Rannis

Table 8. Total R&D expenditure by source of funds and performing sector in million ISK in 2011.

Source of funding	Performing organisation								Total funding	
	Business enterprises	%	Higher education	%	Public organis-ations	%	Private non-profit	%	Total	%
Business enterprises	19.373	**86%**	450	**4%**	462	**6%**	69	**6%**	**20.353**	**48%**
Public contribution	1.825	**8%**	9.317	**83%**	6.381	**85%**	303	**26%**	**17.827**	**42%**
Higher education	-	**0%**	253	**2%**	-	**0%**	211	**18%**	**464**	**1%**
Private non-profit	2	**0%**	209	**2%**	37	**0%**	27	**2%**	**275**	**1%**
From abroad	1.343	**6%**	960	**9%**	647	**9%**	558	**48%**	**3.507**	**8%**
Total	**22.543**	**100%**	**11.189**	**100%**	**7.527**	**100%**	**1.168**	**100%**	**42.427**	**100%**
Share (%) of total R&D expenditure	**53%**		**26%**		**18%**		**3%**		**100%**	

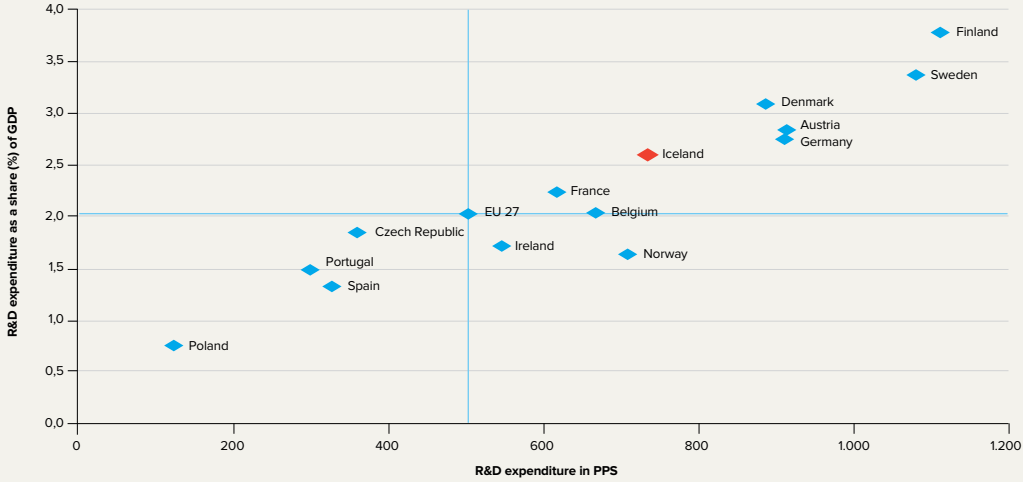
Source: Rannis.

Figure 10. R&D expenditure by business sector by NACE classification in fixed 2011 prices in million ISK from 2007 to 2011.



Source: Rannis

Figure 11. Total R&D expenditure in PPS and R&D expenditure as a share of GDP in various OECD countries in 2011.



Source: Rannis and OECD, Main Science and Technology Indicators. *The purchasing power standard (PPS) is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across borders mean that different amounts of national currency units are needed for the same goods and services depending on the country. PPS are derived by dividing any economic aggregate of a country in national currency by its respective purchasing power parities.

Table 9. R&D personnel (full time equivalent, FTE) by sector of performance and occupation in 2011.

		Researchers	%	Technicians	%	Support staff	%	Total	%
Business enterprises	**Total**	1.060		340		91		1.491	
	Men	786	74%	274	81%	43	47%	1.103	74%
	Women	274	26%	66	19%	48	53%	388	26%
Public organisations	**Total**	411		119		64		594	
	Men	243	59%	60	50%	26	41%	329	55%
	Women	168	41%	59	50%	38	59%	265	45%
Higher education	**Total**	733		109		214		1.057	
	Men	391	53%	65	60%	63	29%	520	49%
	Women	342	47%	44	40%	151	71%	537	51%
Private non-profit	**Total**	54		36		12		102	
	Men	26	48%	13	36%	3	25%	42	41%
	Women	28	52%	23	64%	9	75%	60	59%
All	**Total**	2.258		604		381		3.244	
	Men	1.446	64%	412	68%	135	35%	1.994	61%
	Women	812	36%	192	32%	246	65%	1.250	39%

Source: Rannis.

Table 10. R&D personnel (full time equivalent, FTE) in the Nordic countries by sector and number of researchers thereof in 2011.

Total FTE	Denmark	%	Finland	%	Iceland	%	Norway	%	Sweden	%	Total	%
Business enterprises	37.242	65%	31.180	57%	**1.491**	**46%**	18.044	49%	54.769	70%	**142.726**	**62%**
Public organisations	1.482	3%	6.881	13%	**594**	**18%**	6.556	18%	3.386	4%	**18.899**	**8%**
Higher education	18.151	32%	15.847	29%	**1.057**	**33%**	12.282	33%	20.065	26%	**67.402**	**29%**
Private non-profit	296	1%	619	1%	**102**	**3%**		0%	260	0%	**1.277**	**1%**
Total	**57.171**	**100%**	**54.527**	**100%**	**3.244**	**100%**	**36.882**	**100%**	**78.480**	**100%**	**230.304**	**100%**

Researchers FTE	Denmark	%	Finland	%	Iceland	%	Norway	%	Sweden	%	Total	%
Business enterprises	23.083	62%	22.949	57%	**1.060**	**47%**	12.851	47%	29.620	60%	**89.563**	**57%**
Public organisations	1.162	3%	4.630	12%	**411**	**18%**	4.601	17%	2.097	4%	**12.901**	**8%**
Higher education	13.040	35%	11.964	30%	**733**	**32%**	9.760	36%	17.143	35%	**52.640**	**34%**
Private non-profit	196	1%	460	1%	**54**	**2%**		0%	193	0%	**903**	**1%**
Total	**37.481**	**100%**	**40.003**	**100%**	**2.258**	**100%**	**27.212**	**100%**	**49.053**	**100%**	**156.007**	**100%**

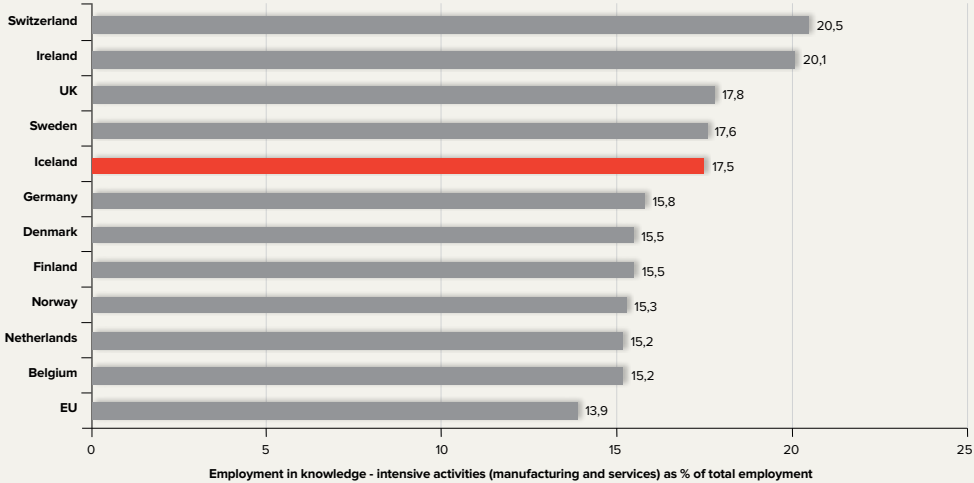
Source: Rannis and OECD, Main Science and Technology Indicators.

Table 11. R&D personnel in business enterprises in the Nordic countries in 2011.

	Denmark	Finland	Iceland	Norway	Sweden
Total business enterprise R&D personnel (FTE)	37.242	31.180	**1.491**	18.111	54.769
Business enterprise researchers (FTE)	23.083	22.949	**1.060**	12.867	29.620
Total R&D personnel per thousand total employment	20,4	21,7	**19,3**	14,0	17,0
Total researchers per thousand total employment	13,4	15,9	**13,5**	10,3	10,6
Women researchers as a percentage of total researchers (headcount)*	-	32,1	**36,0**	36,2	-
Total business enterprise R&D personnel per thousand employment in industry	20,0	17,6	**12,3**	10,8	17,7
Business enterprise researchers per thousand employment in industry	12,4	13,0	**8,7**	7,7	9,6
Employment in knowledge-intensive activities (manufacturing and services) as a % of total employment**	15,5	15,5	**17,5**	15,3	17,6

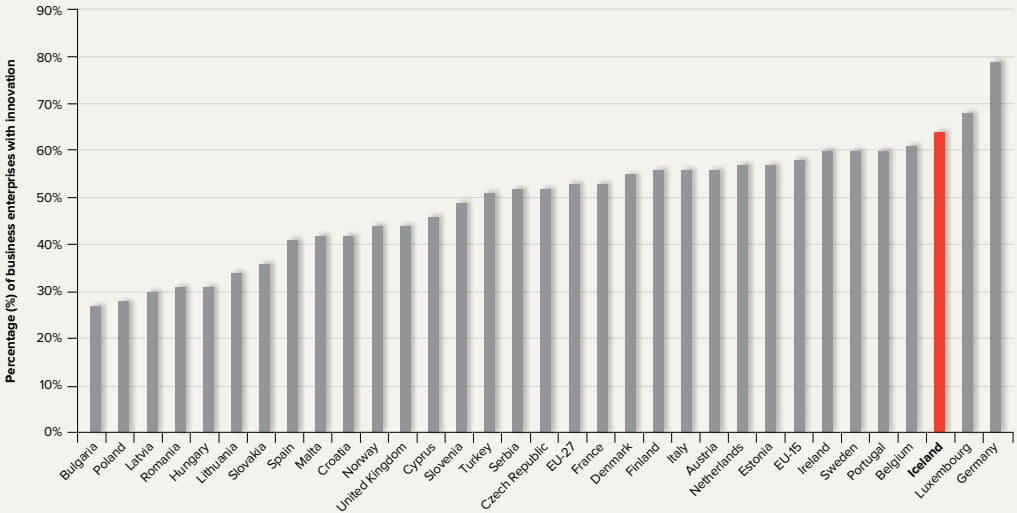
Source: OECD, Main Science and Technology Indicators, Innovation Union Scoreboard 2014 and the Global Innovation Index 2013.
* Data from Denmark and Sweden not available at time of publication.
** Data from 2012.

Figure 12. Employment in knowledge-intensive activities by countries in 2012.*



Source: Innovation Union Scoreboard 2014.
*Knowledge-intensive activities are defined as all ISAT industries at 2-digit level where at least 33% of employment has a higher education degree (ISCED5 og ISCED6).

Figure 13. Business enterprises with innovation activities by countries from 2008 to 2010.



Source: Rannis and the Community Innovation Survey, 2010.

Table 12. Publication activity growth in selected Nordic universities and university hospitals from 2000 to 2012.*

All Nordic countries	Volume 2000-2003	Volume 2004-2007	Volume 2008-2012	Percentage of world production 2000-2003	Percentage of world production 2004-2007	Percentage of world production 2008-2012	Annual growth rate
Denmark	19.069	21.369	34.023	0,57%	0,53%	0,54%	4%
%	21,6	22	24,2				
Number of publications per R&D personnel in universities**		0,95	1,04				
Finland	18.179	19.449	26.739	0,54%	0,48%	0,42%	2%
%	20,6	20,1	19				
Number of publications per R&D personnel in universities		0,72	0,93				
Iceland* **	**624**	**828**	**1.648**	**0,02%**	**0,02%**	**0,03%**	**9%**
%	**0,7**	**0,9**	**1,2**				
Number of publications per R&D personnel in universities		**0,53**	**0,95**				
Norway	10.567	13.313	22.200	0,31%	0,33%	0,35%	5%
%	12	13,7	15,8				
Number of publications per R&D personnel in universities		0,52	0,77				
Sweden	39.911	41.972	56.270	1,18%	1,05%	0,89%	2%
%	45,2	43,3	39,9				
Number of publications per R&D personnel in universities		0,9	1,1				
Total	**88.349**	**96.932**	**140.881**	**2,62%**	**2,42%**	**2,22%**	**3%**

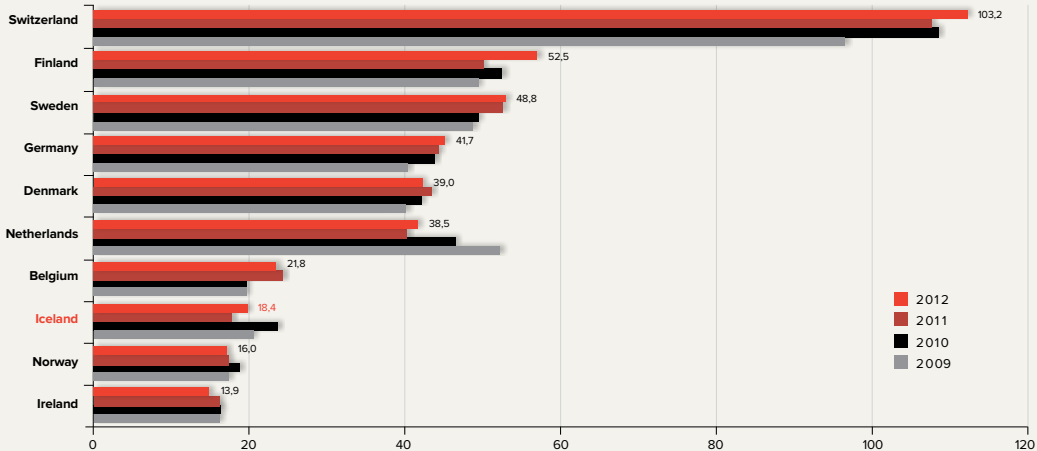
Source: NordForsk, 2014. *The data is based on fractionalised counts. All the basic units (addresses) in a publication share 1 credit, and a country gets 1 fraction each time it appears in the address list. For example, in an article with 4 Swedish addresses and 1 Icelandic address, Sweden receives 4/5 and Iceland 1/5 of the credit for the article. Publications are counted within the following subject fields: Agriculture, Fisheries & Forestry, Biology, Biomedicine, Chemistry, Engineering & Materials Sciences, Geosciences, Health Sciences (including Psychology), Physics & Mathematics, Humanities and Social Sciences. ** Based on the average number (i.e. headcount) of R&D personnel within each time period in universities and academic institutions as defined by OECD.
***Agricultural University of Iceland, Reykjavik University, University of Akureyri, University of Iceland and Landspitali University hospital.

Table 13. Field normalised citation rates (fractionalised) and share of top 10 publications in the Nordic countries (selected universities and university hospitals) from 2000 to 2011.

	Citation rate*			Share of top 10 publications**			Number of field normalized citations
All Nordic countries	**2000-2003**	**2004-2007**	**2008-2011**	**2000-2003**	**2004-2007**	**2008-2011**	**2008-2011**
Denmark	1,25	1,25	1,31	1,30	1,34	1,41	31.624
Finland	1,06	1,03	1,08	1,00	0,98	1,03	20.707
Iceland	**0,94**	**1,11**	**1,05**	**0,77**	**1,03**	**0,97**	**1.176**
Norway	1,02	1,07	1,10	0,95	1,04	1,08	17.271
Sweden	1,12	1,12	1,15	1,11	1,12	1,16	46.762
Averages and total for the Nordic countries	**1,12**	**1,12**	**1,16**	**1,11**	**1,13**	**1,18**	**117.541**

Source: NordForsk, 2014.
* Relative citation rates are reported as index values, where an index value of 1 is the world average for the aggregated field. As a result, an index value of 1,10 represents citation rates 10% above the world average and a value of 0,9 citation rates 10% below the world average. Citation rates are also item-normalised according to publication type, publication year and field-specific citation rates.
** This indicator is based on the share each Nordic university has of the 10% more highly cited papers in each subject field, divided by the world share of the 10% most highly cited papers in the same subject field. The world average is the value of 1.

Figure 14. Number of patent applications to the European Patent Office per thousand inhabitants from 2009 to 2012.



Source: EPO.

2014

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