



GPEARI

Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais

Ministério da Educação e Ciência

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Ministry of Education and Science

PORTUGAL

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V Taller de Armonización de Indicadores
Panamá, 17 y 18 de noviembre de 2011



Overview

- ✓ Main activities of the statistical office
- ✓ R&D (Expenditure and Human Resources)
- ✓ CIS (Community Innovation Survey)
- ✓ CDH (Careers on Doctorate Holders)
- ✓ Scientific Production
- ✓ Higher Education
- ✓ Observatory of Science, Technology and Qualifications



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GPEARI/MEC – Surveys and other data:

Science and Technology:

- R&D Survey;
- CIS (Community Innovation Survey);
- CDH (Careers on Doctorate Holders) Survey;
- Scientific Production.

Higher Education:

- Higher Education Survey – REBIDES;
- Survey on Students Enrolled and Graduates in Higher Education – RAIDES;
- National Register of Doctoral Degrees – RENATES.



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R&D Survey (IPCTN):

- Executed every two years between 1982 and 2007;
- Annual since 2008 (Commission Regulation 753/2004);
- The survey is carried out according to the of Frascati Manual;
- Collects data on expenditure and human resources R&D activities in the four sectors of performance: business enterprise; government (with a dedicated survey for hospitals since 1999); higher education; and private non profit sectors.



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R&D Expenditure

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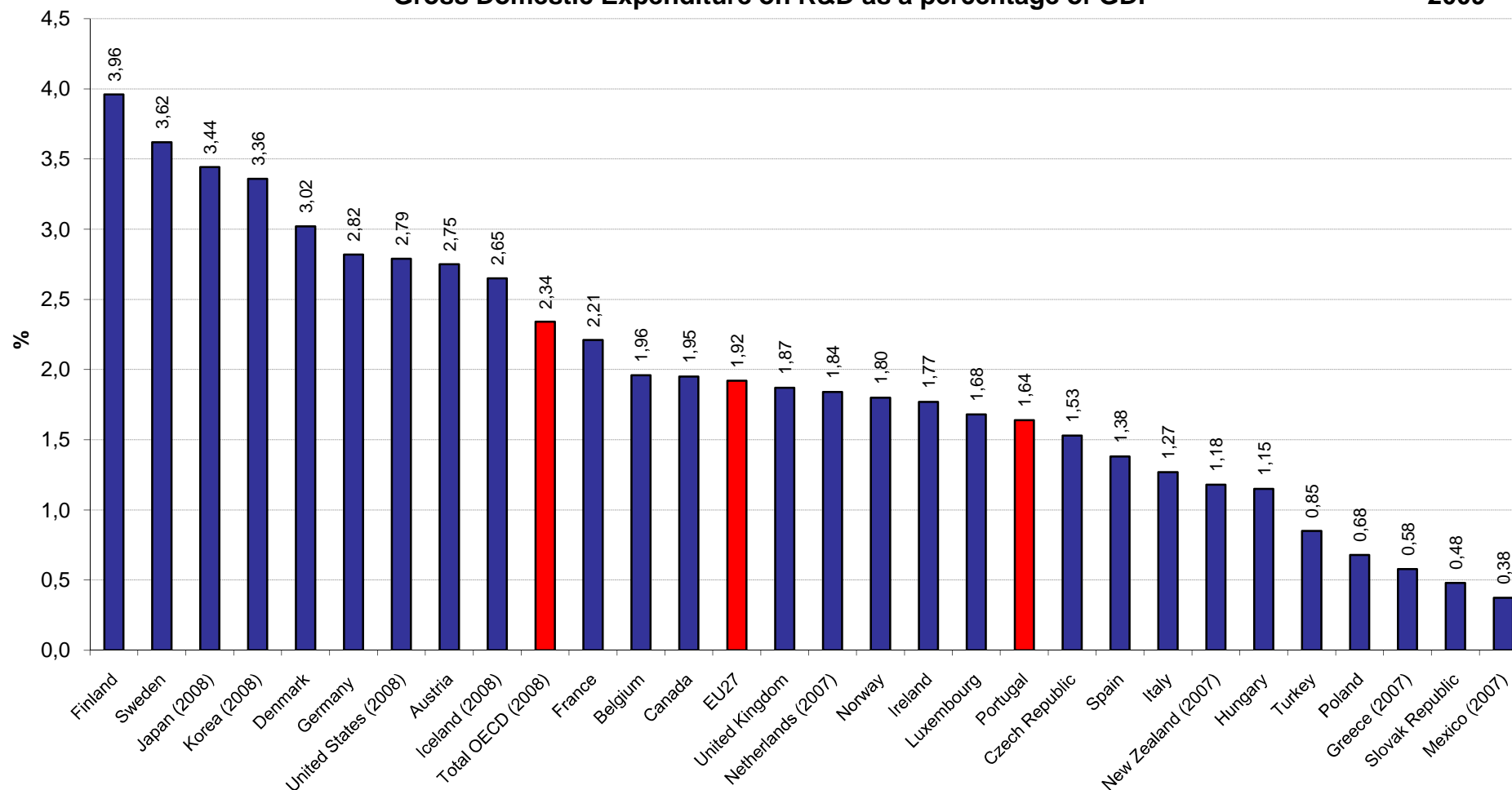
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Gross Domestic Expenditure on R&D as a percentage of GDP

2009



Sources: OECD.Stat: Main Science and Technology Indicators Database (2010-2); GPEARI/MEC, Portuguese R&D Survey.

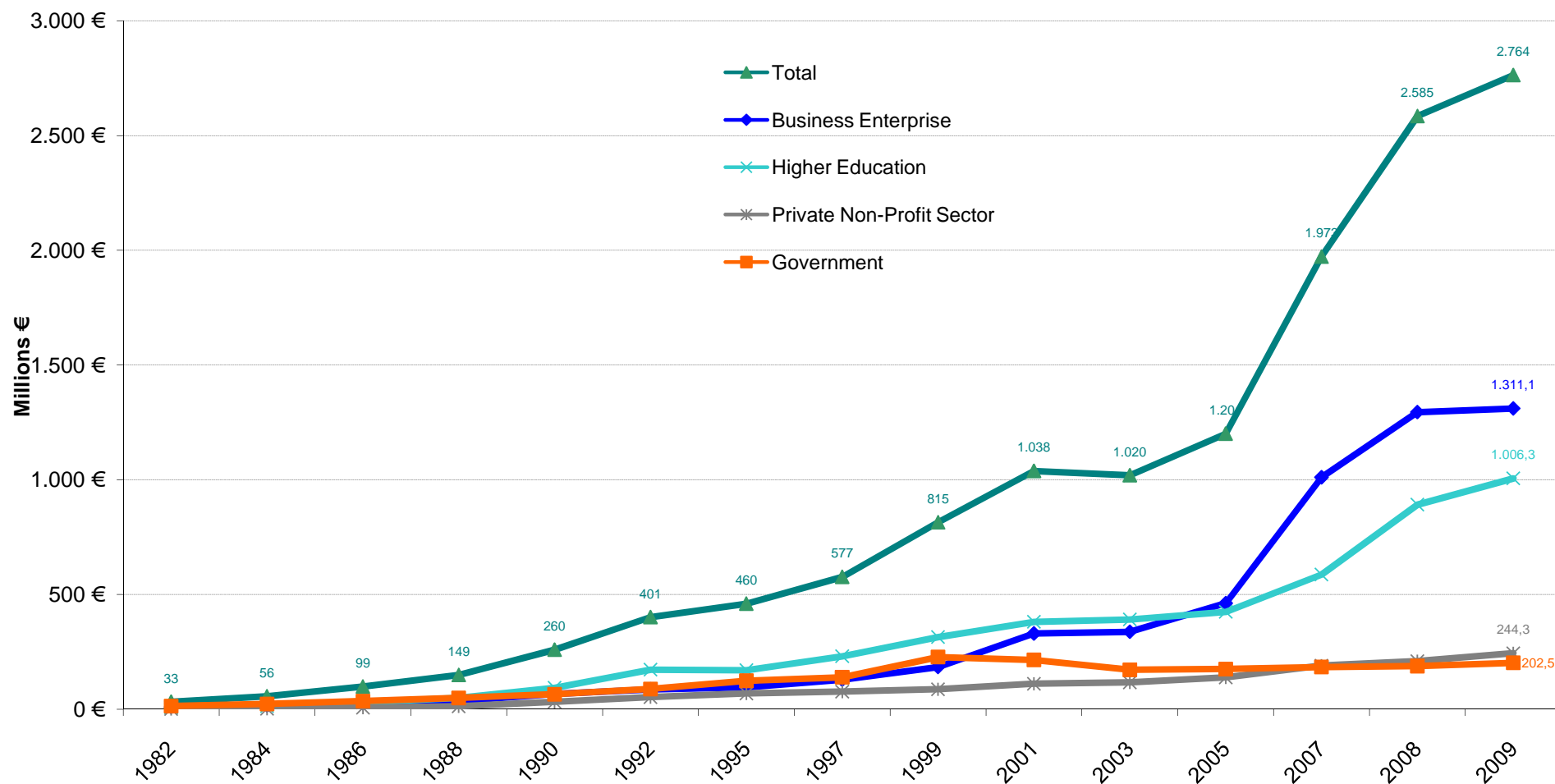
Notes: Data for Japan has a break in series with previous year for which data is available. Data for OECD Total and EU27 are a Secretariat estimate or projection based on national sources. Data for Denmark, Germany, France and Greece are national estimates or projections adjusted, if necessary, by the Secretariat to meet OECD norms. Data for United States excludes most or all capital expenditure. Data for Sweden, United States, Austria, Iceland, Belgium, United Kingdom, Canada, EU27, Netherlands, Luxembourg, Norway, Ireland and Italy are provisional.

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Gross Domestic Expenditure on R&D by sector of performance

1982-2009



Source: GPEARI / MEC, Portuguese R&D Survey.

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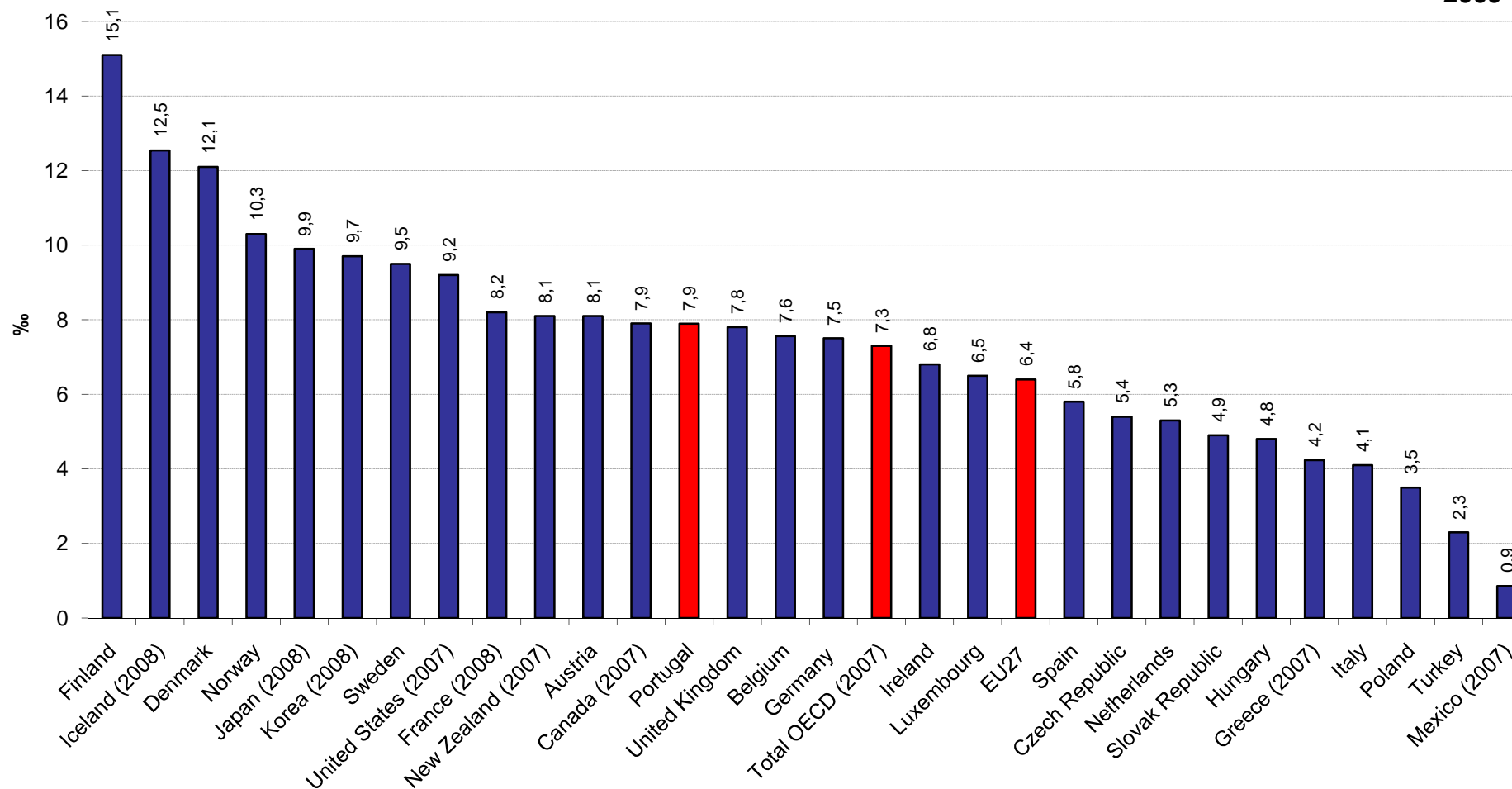
R&D Human Resources

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Researchers (FTE) per thousand labour force

2009



Sources: OECD.Stat: Main Science and Technology Indicators Database (2010-2); GPEARI / MEC, Portuguese R&D Survey.

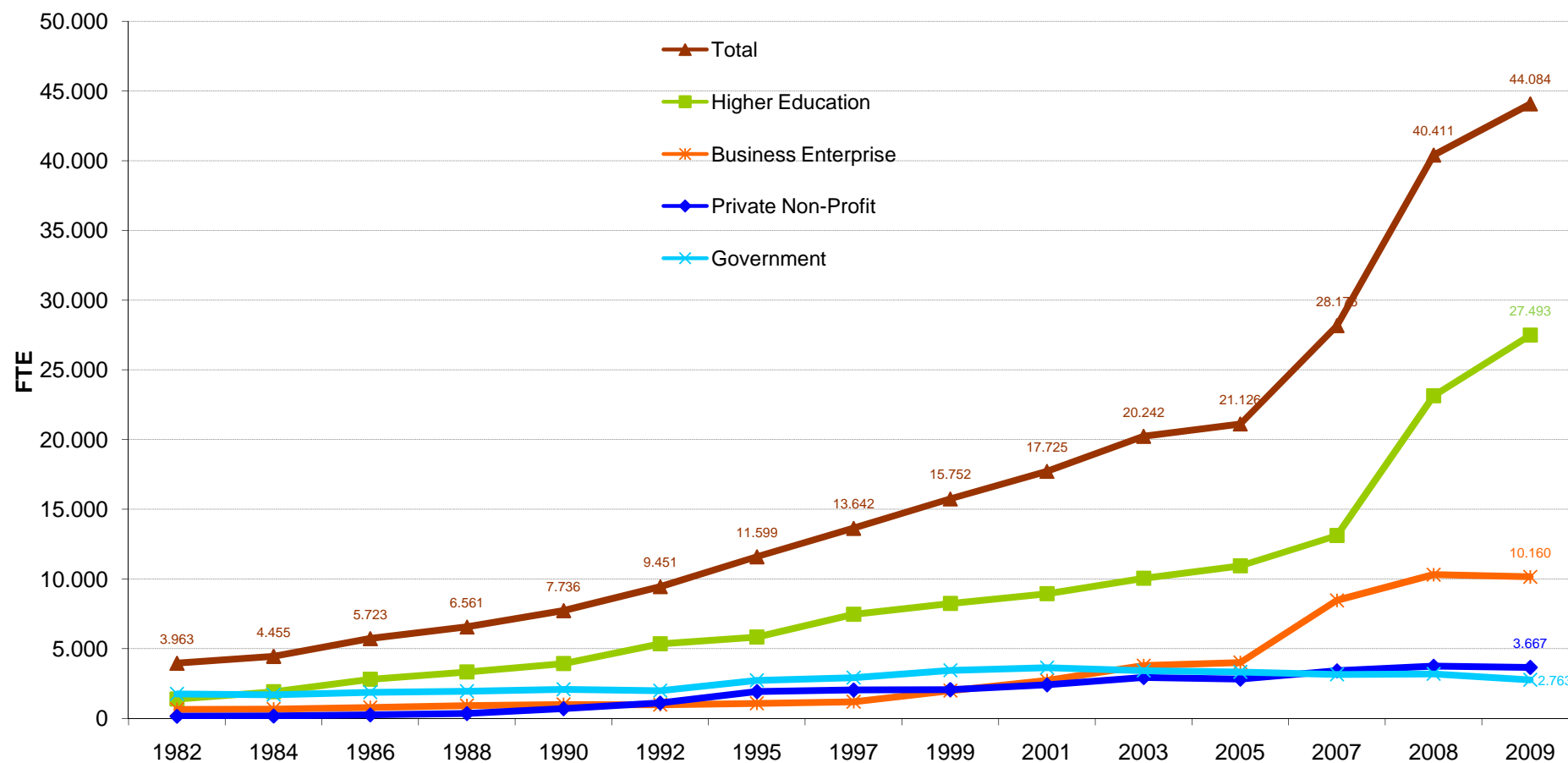
Notes: Data for Japan and Korea has a break in series with previous year for which data is available. Data for EU27, Netherlands, OECD, Turkey and United States are a Secretariat estimate or projection based on national sources. Data for Denmark, Austria, Canada, Germany and Greece are national estimates or projections adjusted, if necessary, by the Secretariat to meet OECD norms. Data for Norway, United Kingdom, Austria, Belgium, Luxembourg, EU27, Netherlands and Italy are provisional. Data for Sweden is underestimated or based on underestimated data.

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Researchers (FTE) by sector of performance

1982-2009



Source: GPEARI / MEC, Portuguese R&D Survey

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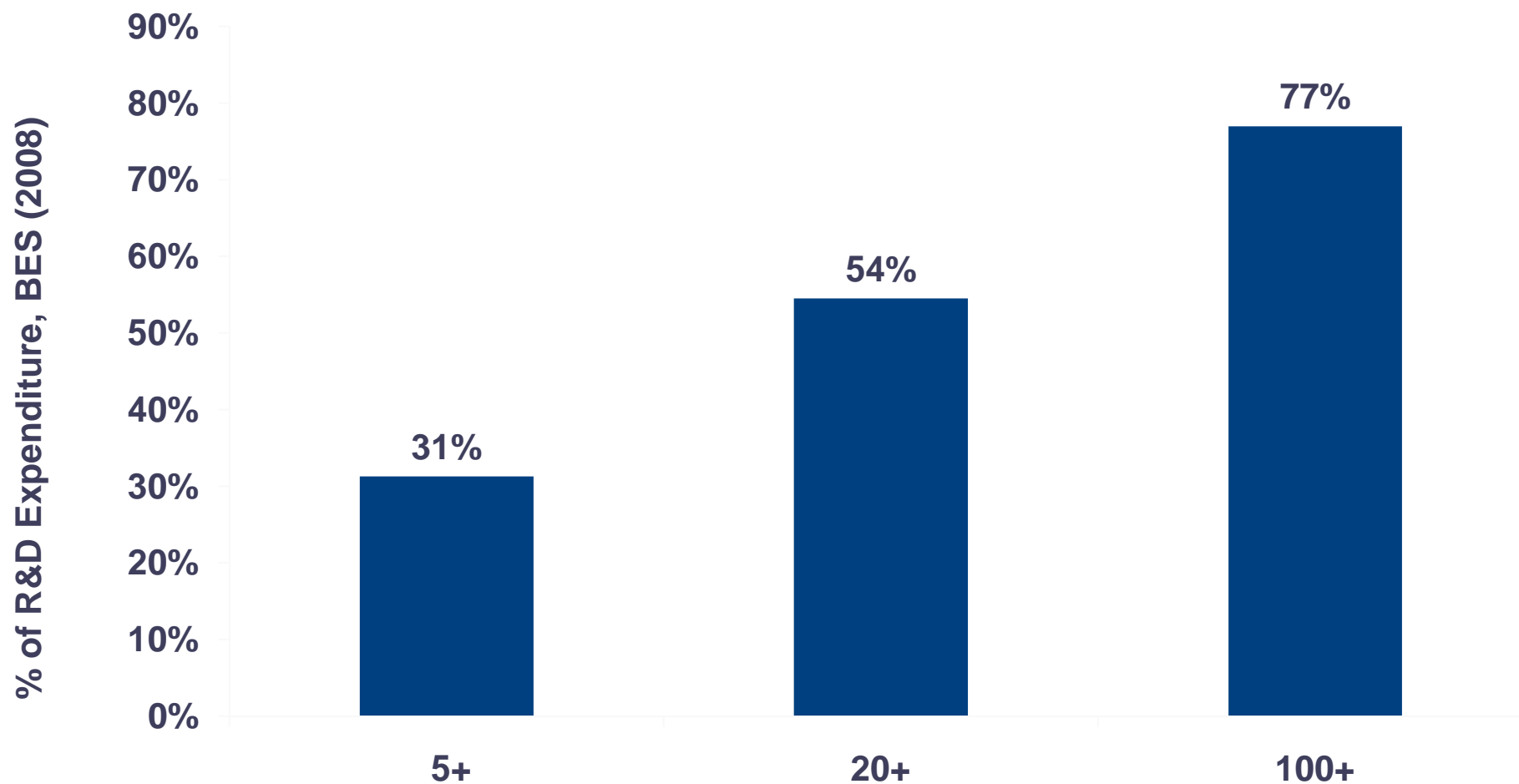
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R&D Expenditure in BES

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Level of concentration of R&D Expenditure in firms



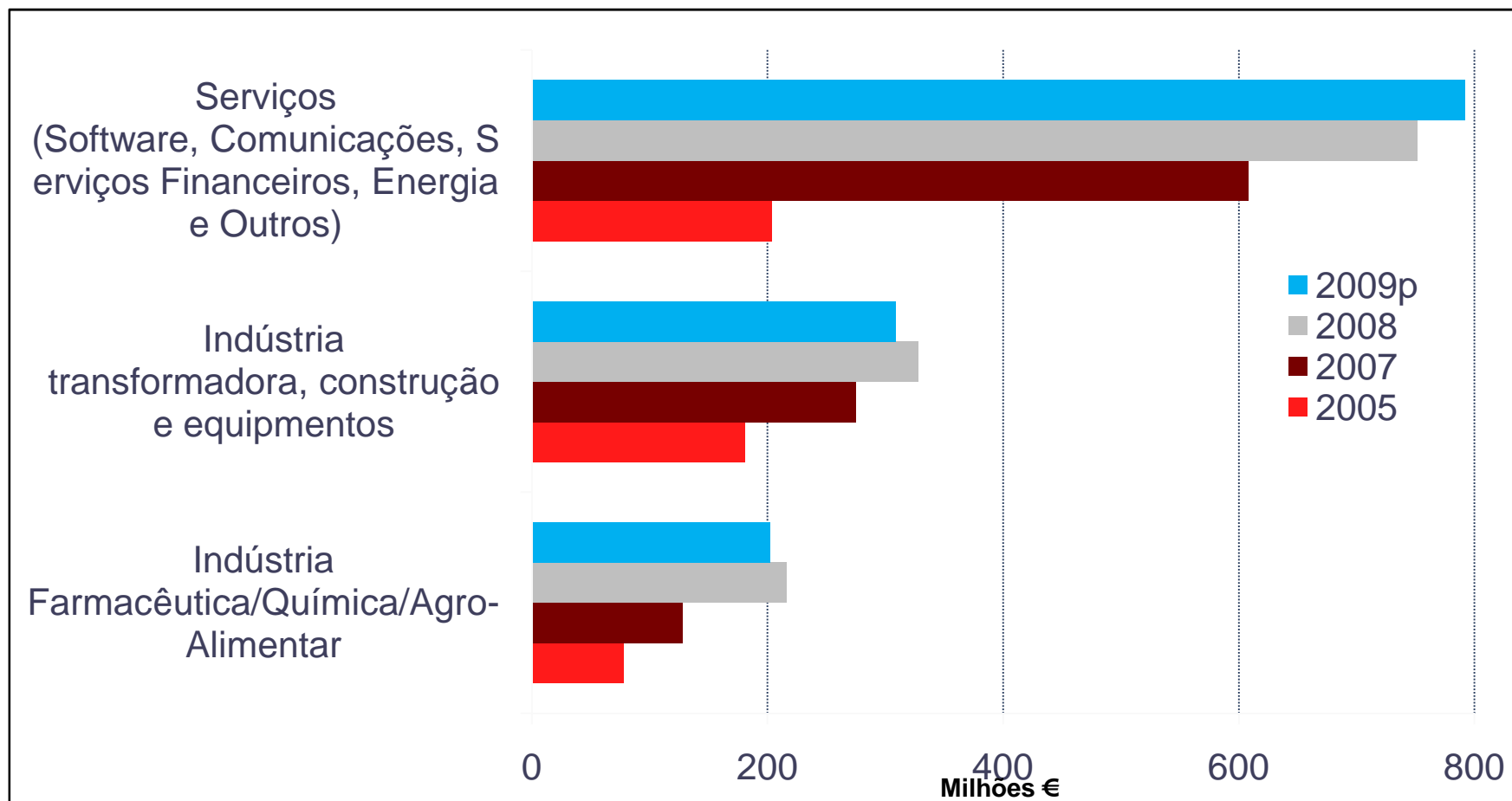


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R&D Expenditure in Business Enterprise Sector

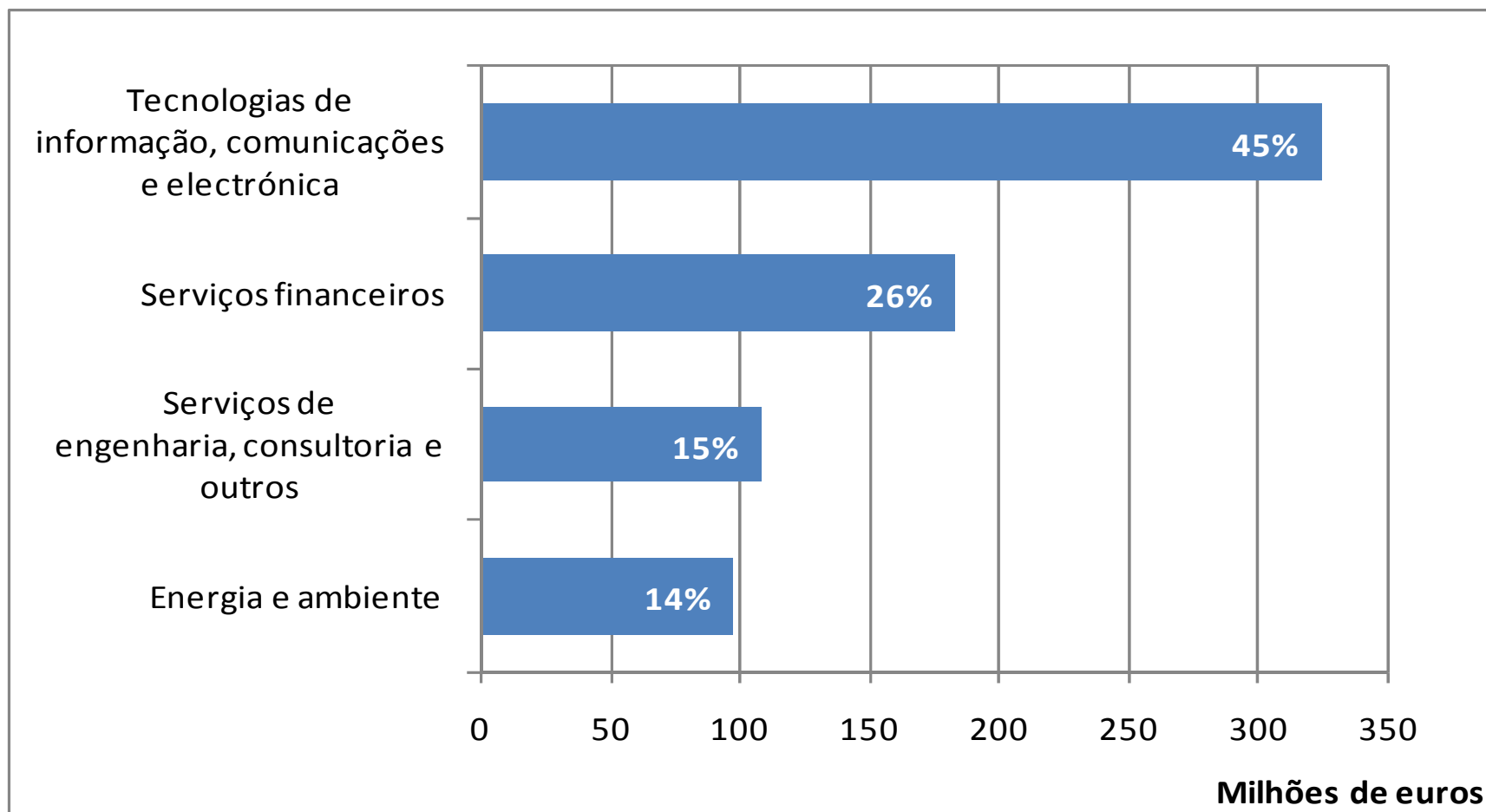


Notes: p – provisiona data; **Source:** GPEARI / MEC, R&D Survey

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R&D Expenditures in Firms: Services, 2008





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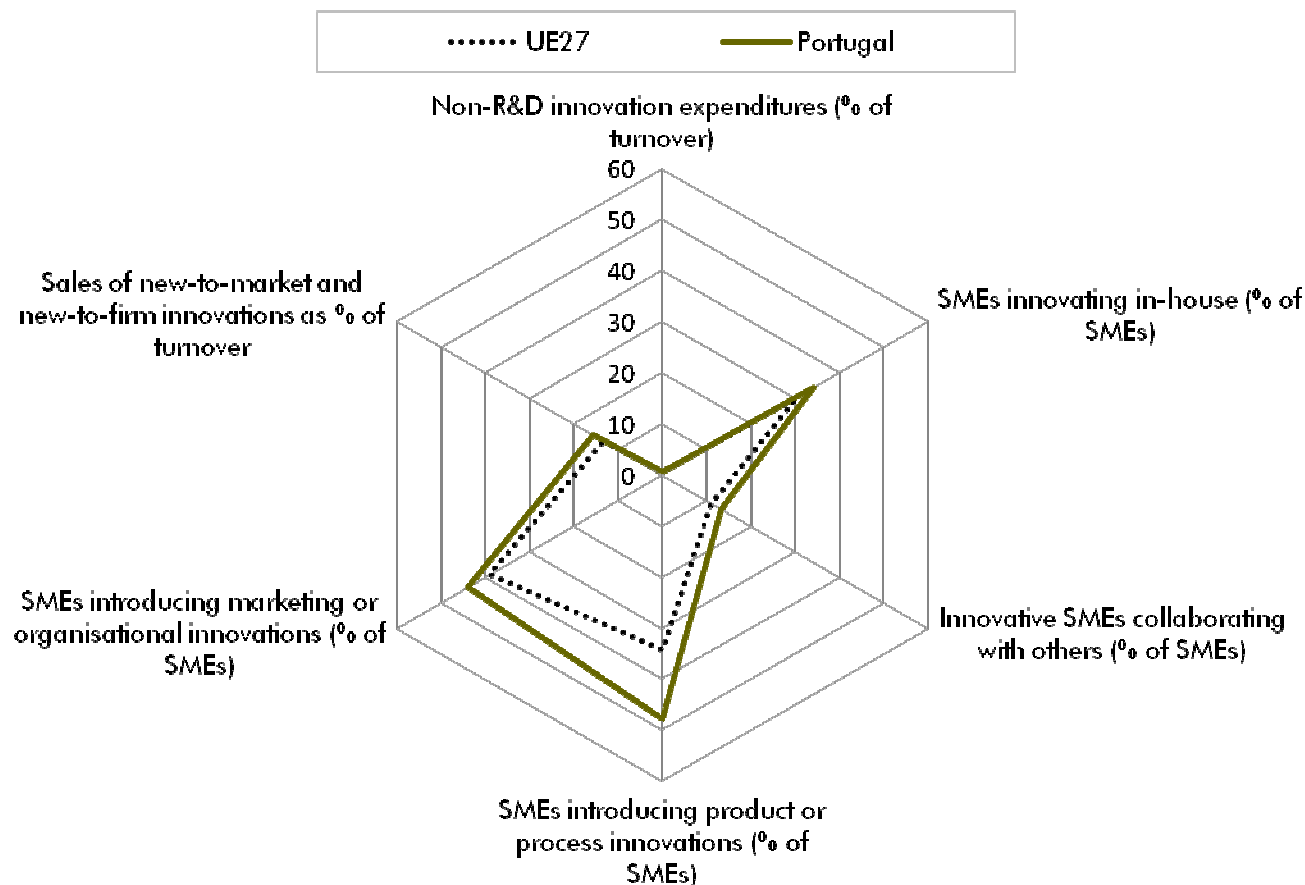


Community Innovation Survey (CIS):

- The CIS started in 1991 and the CIS2010 is the 8th statistical operation (Commission Regulation 1450/2004);
- Is the main data source for measuring innovation in Europe;
- The survey is carried out according to the 3th edition of Oslo Manual;
- CIS is conducted every two years since CIS4 and GPEARI participated in all CIS.



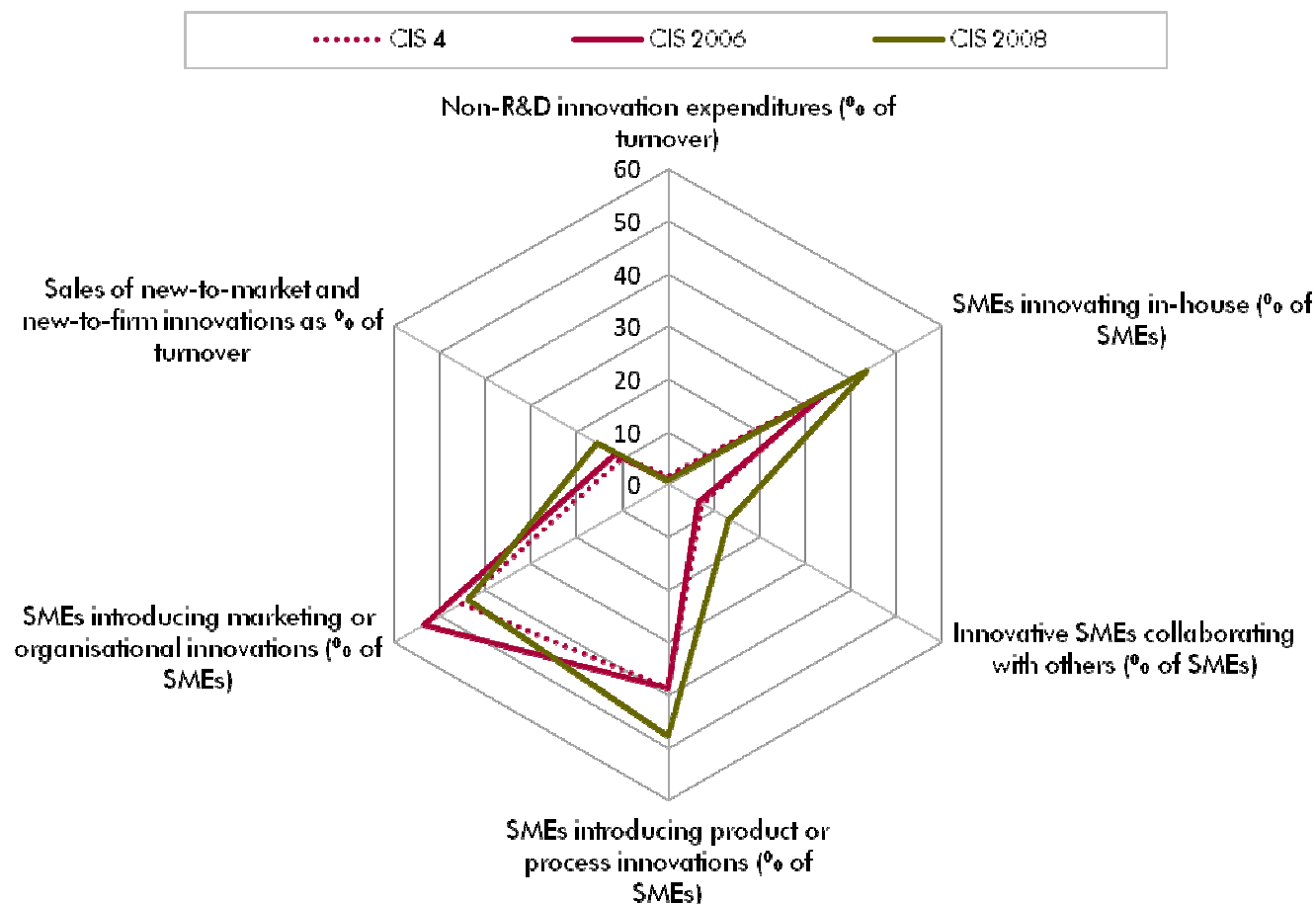
CIS indicators on Innovation Union Scoreboard (IUS 2010)



Source: Innovation Union Scoreboard (IUS 2010)



Evolution based on CIS IUS 2010 indicators in Portugal

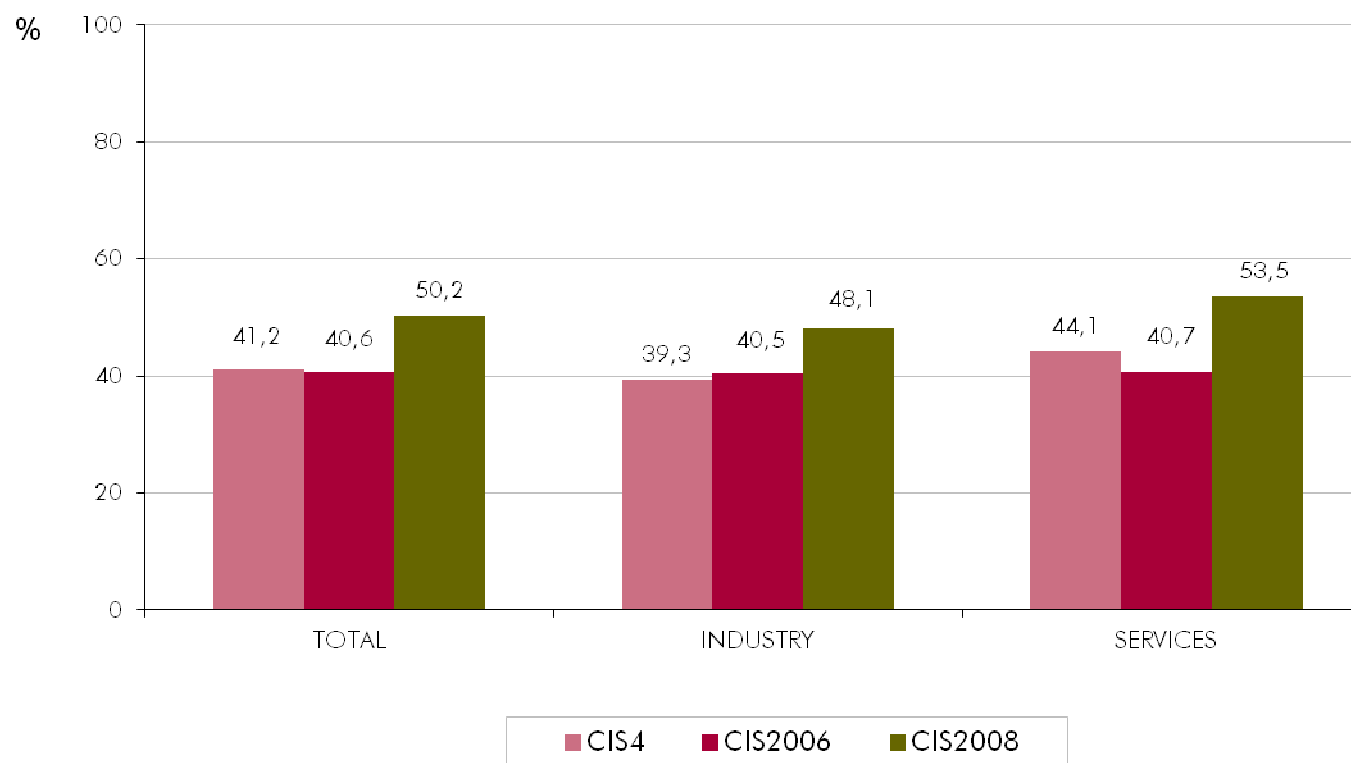


Source: GPEARI / MEC, Community Innovation Survey (CIS)

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Enterprises with technological innovation by economic activity



Source: GPEARI / MEC, Community Innovation Survey (CIS)

Metadata: ¹Technological Innovation - enterprises with Product and/or Process Innovation and ongoing or abandoned Innovation



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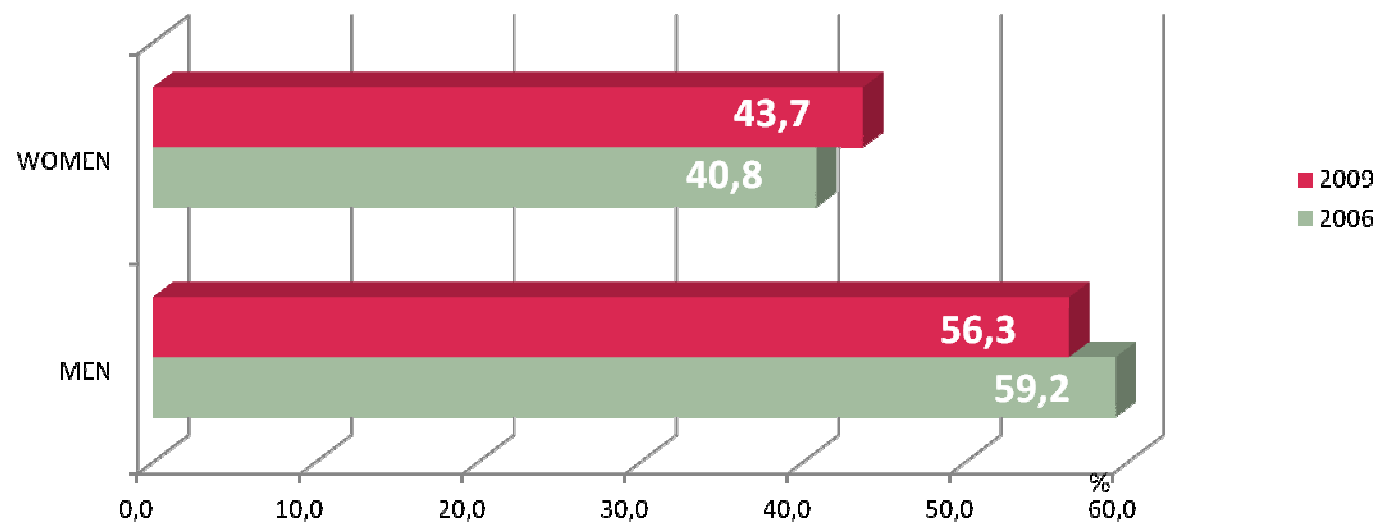


Careers on Doctorate Holders (CDH):

- Collects biographic, academic and professional data of doctorates holders living in Portugal, and also data on international mobility and scientific production of doctorate holders, thereby enabling the construction of internationally comparable indicators based on a stable and internationally harmonized methodology;
- It is a sample survey stratified by sex, age class, field of science and year of doctorate award addressed to all individuals who held a doctorate degree (ISCED level 6), obtained anywhere in the world, lived (temporarily or permanently) in Portugal and had less than 70 years old;
- Started in 2005 with a pilot survey (CDH04), and two more editions: CDH06 and CDH09;
- Is taskforce between UNESCO, OECD and Eurostat (UOE).



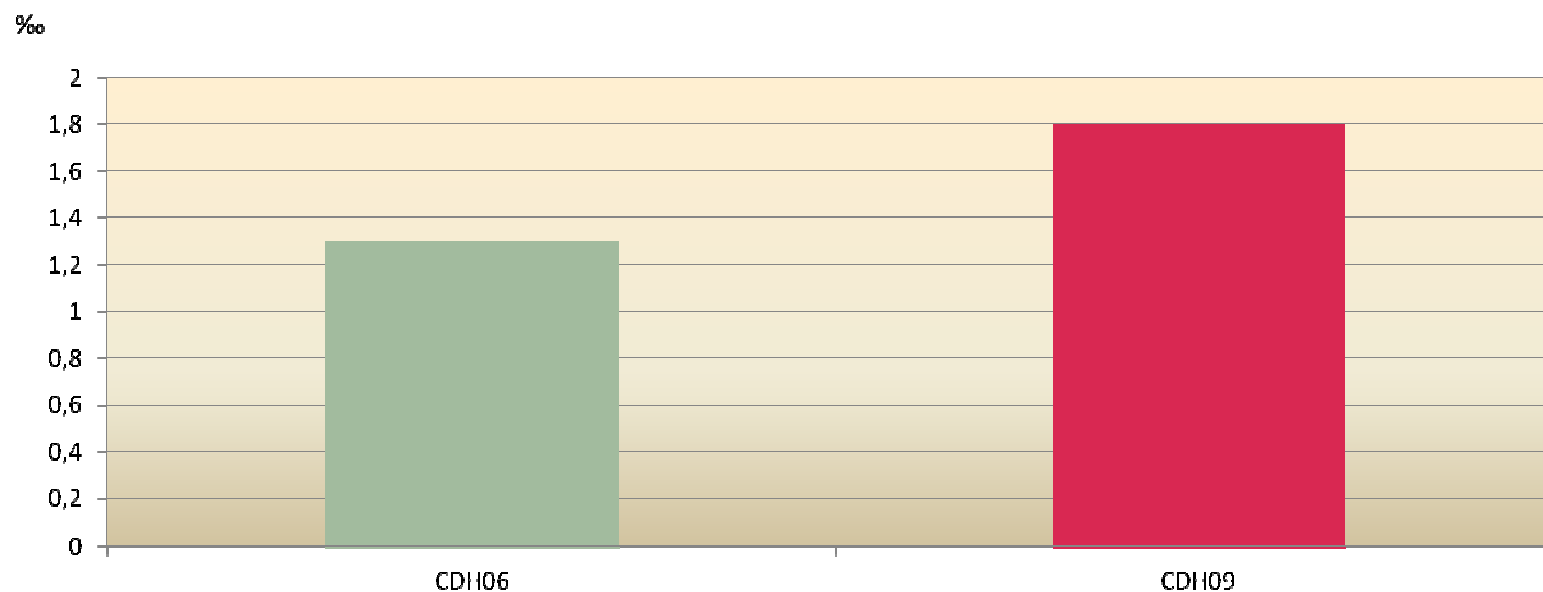
Doctorate Holders by sex (2006-2009)



Source: GPEARI/MEC, CDH06 and CDH09



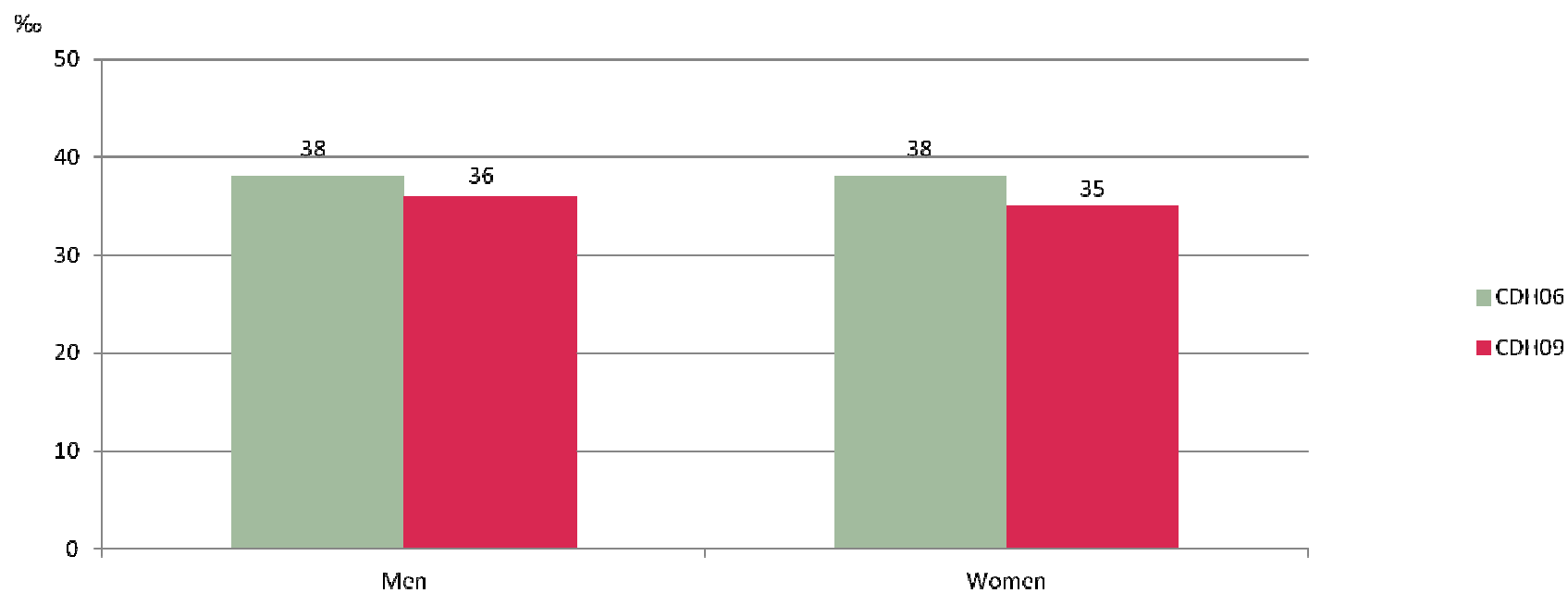
Doctorate Holders per thousand population (2006 -2009)



Sources of data: GPEARI/MEC, CDI106 and CDI109.



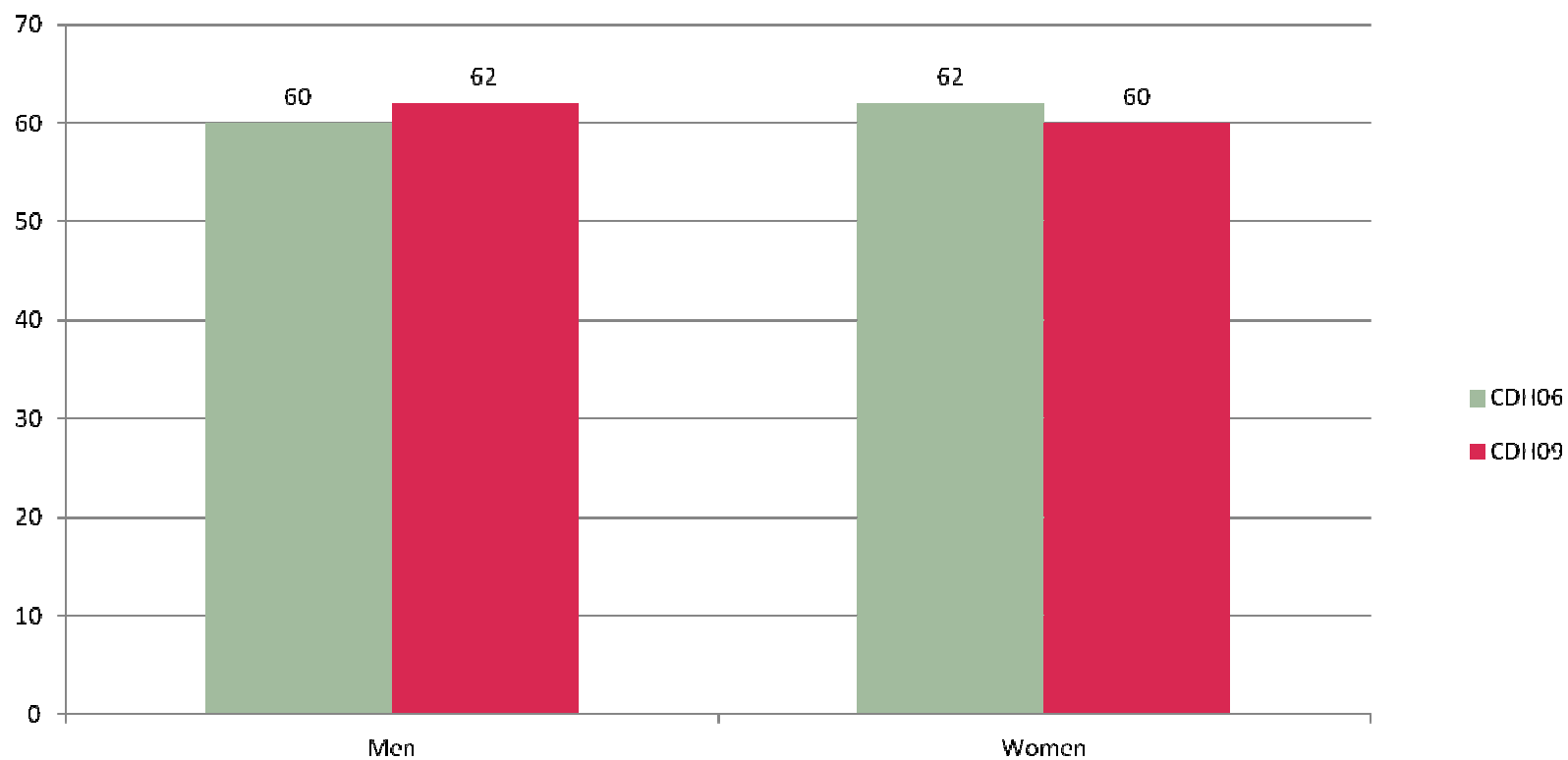
Age at graduation (2006-2009)



Source: GPEARI/MEC, CDH06 and CDH09



Time to completion the doctorate (2006-2009)



Source: GPEARI/MEC, CDH06 and CDH09.



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Scientific Production:

Statistical Series

- Analysis and characterization of the National Scientific System using indicators;
- The main indicators are: evolution of number of publications distributed by year, fields of science and by type of document; evolution of international co-authorship by year, by country and by fields of scientific;
- Sources: Thomson Reuters, namely National Citation Report, Web of Science and *InCites*.



Scientific Production (cont.):

Bibliometric Indicators

- Analysis of the Portuguese publications impact and international comparison.
- The main indicators are: impact evolution (total citations/number of papers; cited papers; percent cited; impact relative to field; impact relative to country) distributed by year and fields of science.
- Sources: Thomson Reuters, namely National Science Indicators and *InCites*.



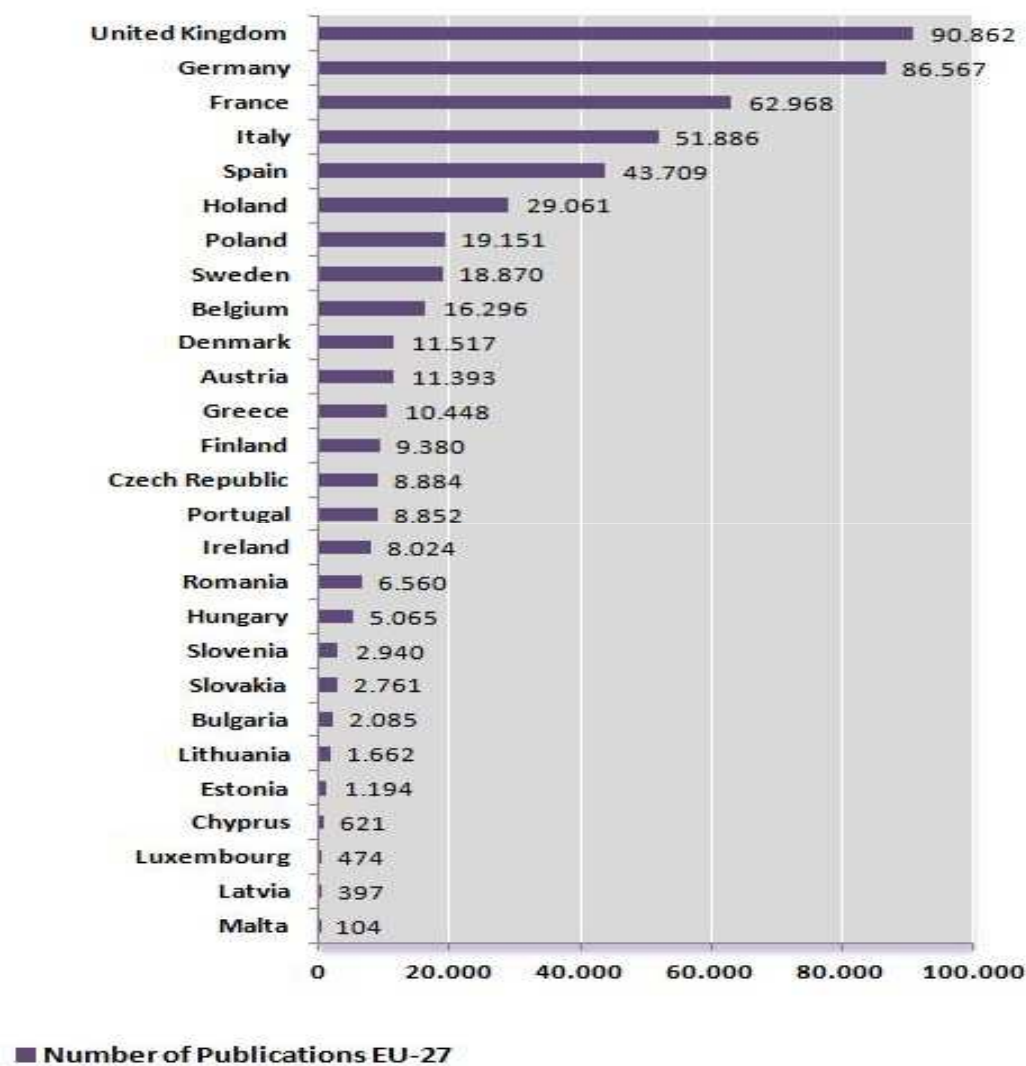
Scientific Production (cont.):

SciELO Portugal

- Is available since 2005.
- The objective is to increase the international visibility of the best Portuguese journals, in order to achieve scientific excellence and increased impact (three SciELO Portugal journals indexed in Web of Science).



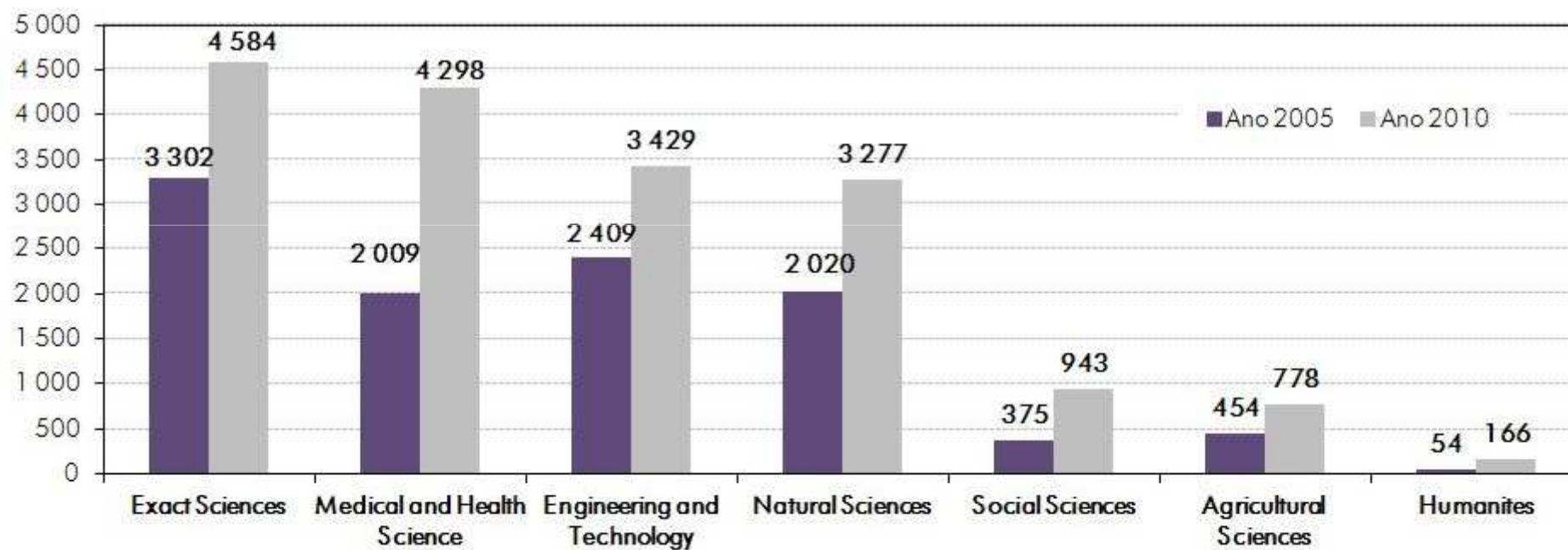
Number of Scientific Publications (SCI) in the European Union (2010)



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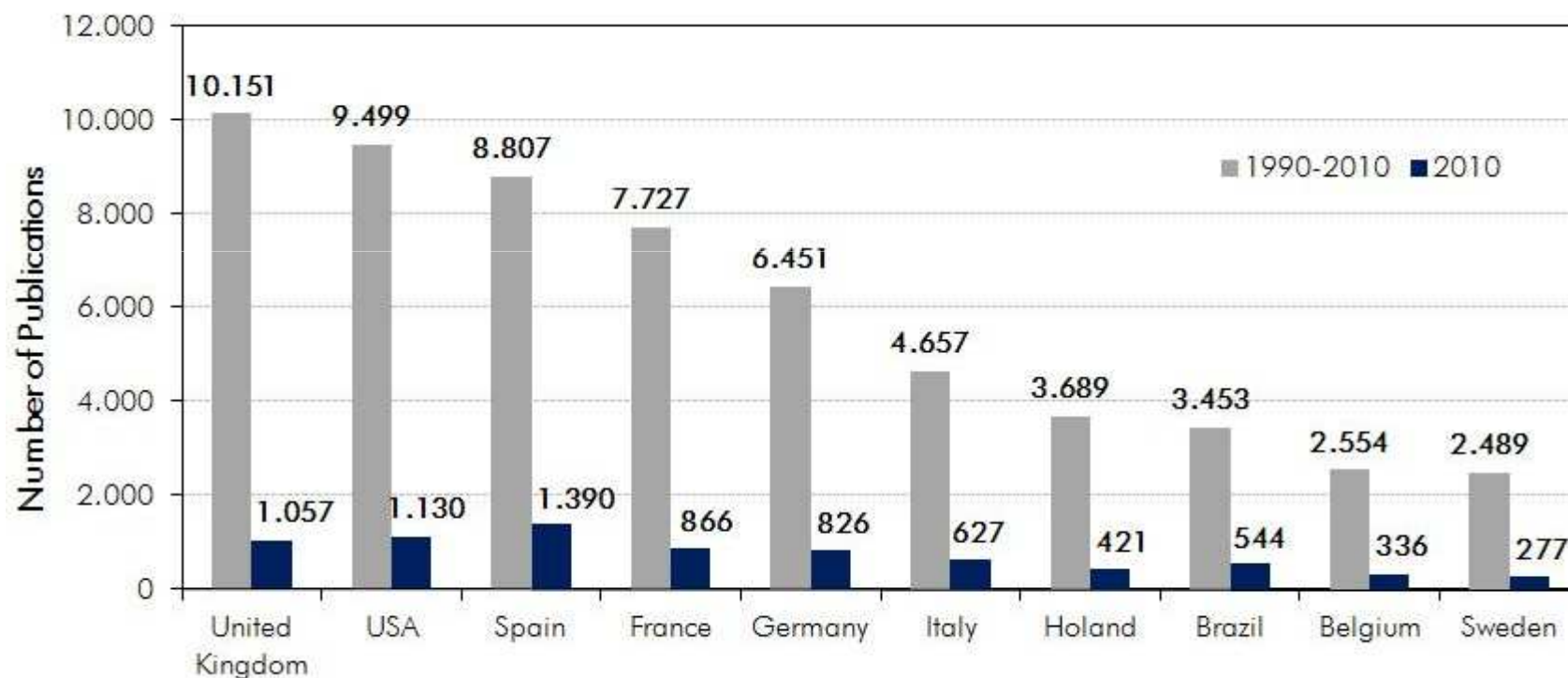
Number of publications by field of science (2005 and 2010)



Source: GPEARI / MEC - InCitesTM, Thomson Reuters (2010)



Top 10 countries in co-authorship with Portugal 1990-2010 and 2010

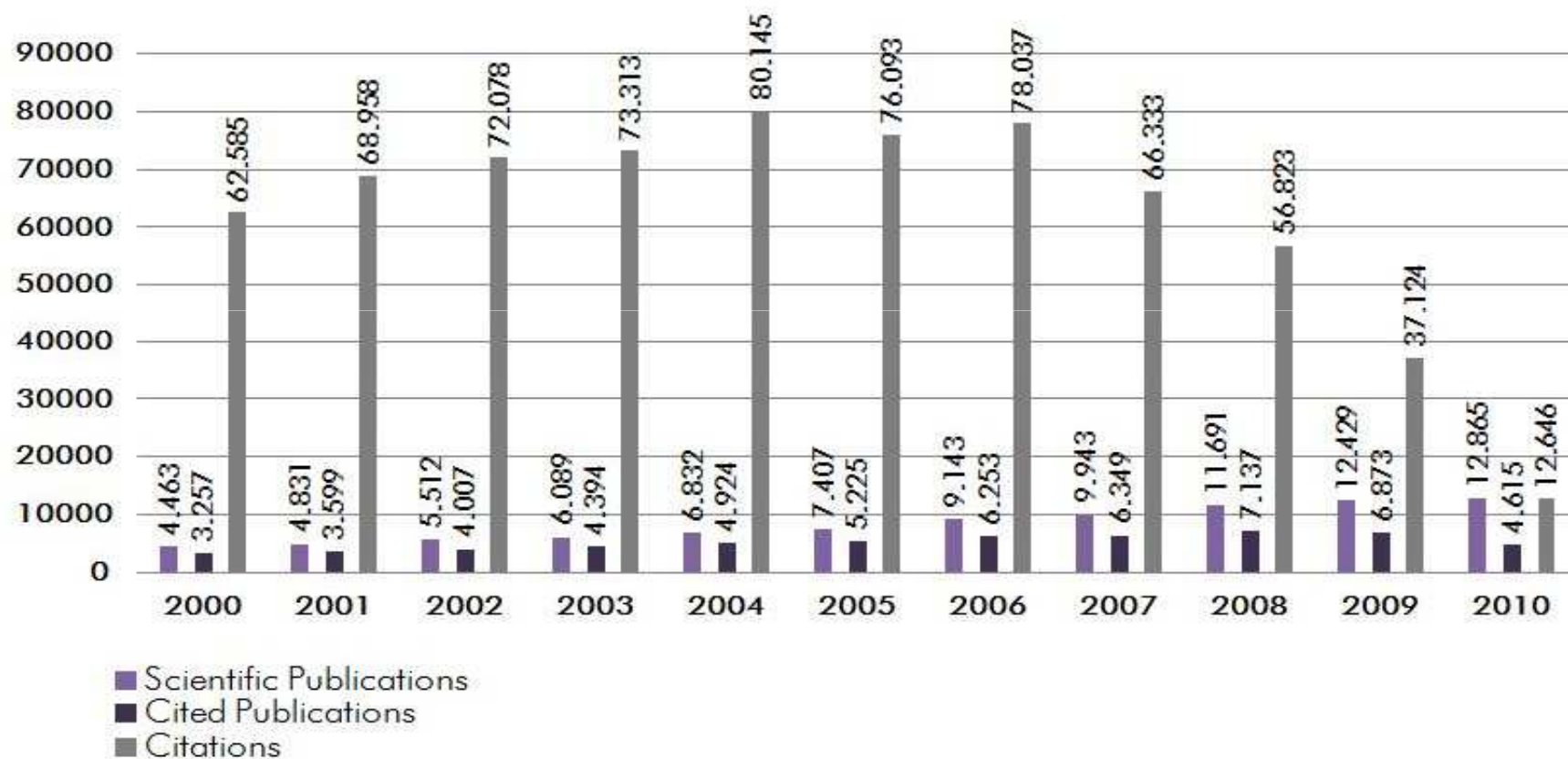


Source: GPEARI / MEC - InCitesTM, Thomson Reuters (2010)

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Number of papers, cited papers and citations (2000-2010)



Source: GPEARI / MEC - InCitesTM, Thomson Reuters (2010)

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Collection Evolution

	2005	2011	Growth Rate
Journals	5	39	680%
Numbers	44	522	1086%
Articles	609	5766	847%



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Higher Education Survey - REBIDES

- Is a biographical register of Higher Education Academic Staff in all higher education institution (private and public);
- It is a nominal database that collects variables such as: education subsystem, gender, age, nationality, professional category, type of contract, main activities carried out, academic qualifications, fields of education of teacher's qualifications;
- Started in 2001 and is collected yearly.



Survey on Students Enrolled and Graduates in Higher Education – RAIDES

- The survey is annual and started in academic year 2008/2009;
- Gives updated statistics that allow the characterisation of the Higher Education system, regarding the students enrolled and graduates;
- It collects two types of information: 1) main variables: education subsystem, gender, age, nationality, academic degrees, region and district, fields of education, final classification, number of years to complete the degree and country of prior education; 2) socioeconomic variables: marital status, parents' education level, employment status and activity/occupation status, current occupation.



New entrants, students enrolled and graduates in higher education, from 1999-00 to 2010-11

	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
New entrants	84 746	93 249	92 836	94 446	89 269	84 586
Students enrolled	373 745	387 703	396 601	400 831	395 063	381 231
Graduates	54 255	61 140	64 098	68 511	68 668	69 987

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
New entrants	83 773	96 769	117 661	119 298	126 735	137 051
Students enrolled	368 571	368 982	381 728	378 834	389 841	403 445
Graduates	72 061	84 154	85 791	78 589	81 257	-



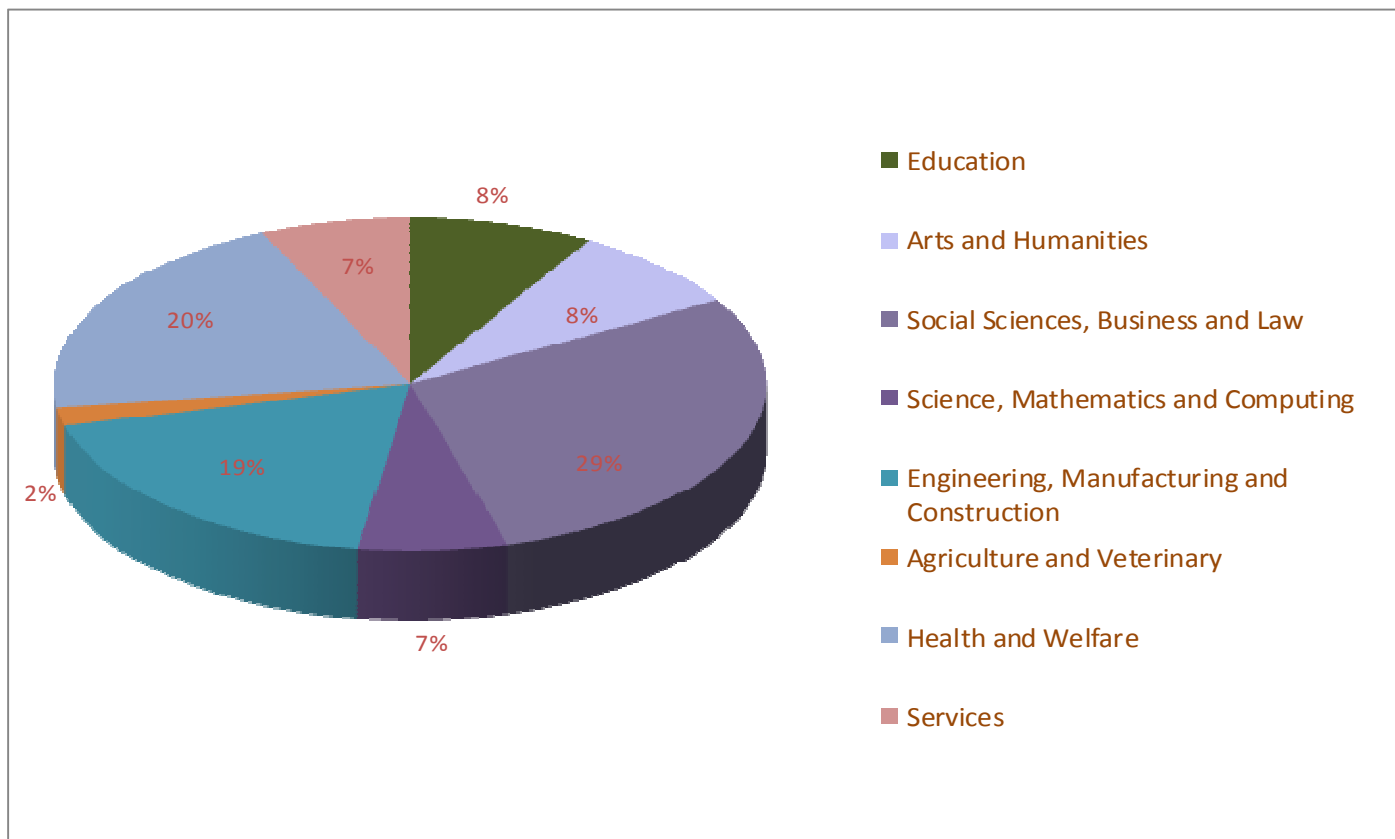
Students with foreign nationality enrolled in Higher Education by country of origin – academic year 2001-02 and 2010-11

Country of origin	2001-02		2010-11	
Brazil	1 525	(3rd)	5 395	(1st)
Green Cape	2 497	(2nd)	3 432	(2nd)
Angola	3 183	(1st)	3 165	(3rd)
Spain	456	(7th)	1 571	(4th)
Sao Tome and Principe	441	(8th)	848	(5th)
Mozambique	1 074	(5th)	712	(6th)
Italy	126	(17th)	617	(7th)
France	1 313	(4th)	605	(8th)
Ukraine	8	(41th)	435	(9th)
Germany	315	(10th)	425	(10th)

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Graduates in Higher Education by field of education – academic year 2009-10



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Science and technology graduates by gender

Graduates (ISCED 5-6) in mathematics, science and technology per 1 000 of population aged 20-29, since 2004

Time	Total	Male	Female
2004	8,9	10,5	7,3
2005	9,5	11,2	7,7
2006	9,6	11,4	7,7
2007	14,2	18,2	10,2
2008	16,3	20,7	11,8
2009	14,6	18,3	10,8
2010	14,4	17,8	10,8



National Register of Doctor Degrees – RENATES

- These data allows to characterize the higher education system regarding the universe of Ph.D.'s students and Ph.D.'s;
- The information collected is gathered in two databases: 1) National register of doctoral themes of thesis in progress (according to the law 52/2002 of 2nd of March); 2) Ph.D.'s obtained or recognized in Portugal;
- Started in 1970 and is collected every year.



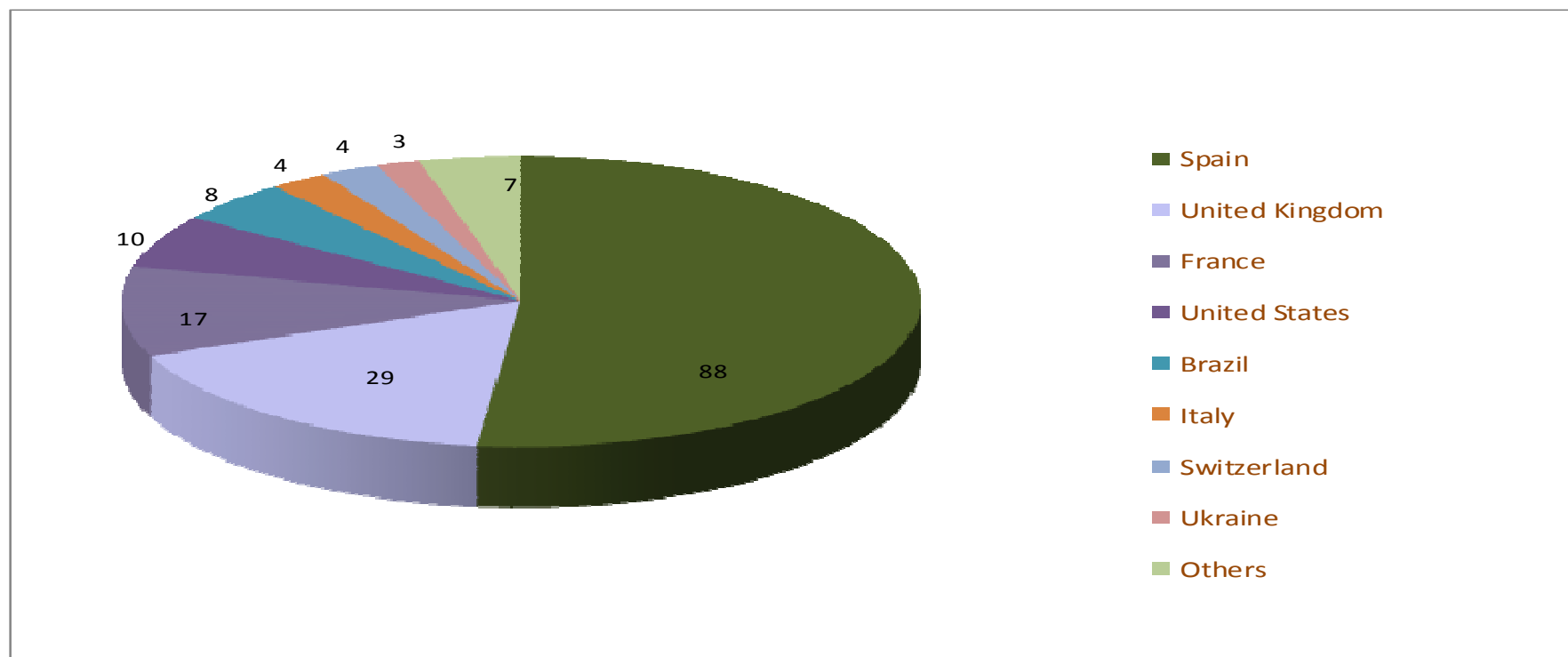
Ph.D.'s awarded or recognized in Portugal, from 2000 to 2010

	2000	2001	2002	2003	2004	2005
Ph.D.'s awarded in Portugal	694	705	801	840	930	1 058
Ph.D.'s awarded abroad	166	203	184	188	156	140
Total	860	908	985	1 028	1 086	1 198

	2006	2007	2008	2009	2010
Ph.D.'s awarded in Portugal	1 161	1 278	1 330	1 398	1496
Ph.D.'s awarded abroad	144	198	192	197	170
Total	1 305	1 476	1 522	1 595	1 666



Ph.D.'s awarded abroad and recognized in Portugal, by country, 2010





Ph.D.'s awarded or recognized in Portugal by field of science

	2000	2005	2009	2010
Science and Engineering	550	767	953	994
Natural Sciences	270	336	411	375
Medical and Health Sciences	96	123	188	233
Engineering and Technology	152	273	311	338
Agricultural Sciences	32	35	43	48
Social Sciences and Humanities	310	431	642	672
Total	860	1 198	1 595	1 666



Females in the total number of graduates with Ph.D. degree (%) by field of science

	2000	2005	2009	2010
Science and Engineering	40,5	37,8	50,4	51,9
Natural Sciences	42,6	34,8	54,5	58,4
Medical and Health Sciences	54,2	52,8	55,9	61,4
Engineering and Technology	24,3	31,1	39,9	35,2
Agricultural Sciences	59,4	65,7	62,8	72,9
Social Sciences and Humanities	50,6	54,5	53,1	58,6
Total	44,2	43,8	51,5	54,6



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Observatory of Science, Technology and Qualifications

The **OSTQ** is a joint project of the Fundação para a Ciência e Tecnologia (FCT) and GPEARI/MEC with the purpose to study the national scientific and technological capacity, particularly in regard to qualified human resources, their institutional placement and the conditions for their settling in Portugal, in a manner that complements and supplements the normal exercises of science and technology surveys, encouraging external research teams to work in close collaboration with the services of the Ministry of Education and Science responsible for gathering and publishing statistics.



Observatory of Science, Technology and Qualifications

The projects and activities to be performed should be guided by a set of questions in the following areas:

- Observation of employment and mobility of the graduates;
- Graduate and PhD employment and mobility;
- Progress of the science, technology and innovation indicators;
- Economic and social Impact of science and technology.



Observatory of Science, Technology and Qualifications

Projects:

- User Innovation;
- Mobility and employment of graduates in Portugal in the last decade (2001-2011);
- Social mobility driven by higher education and S&T – the last 50 years (1960-2010).



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