

Research and Development

in Ireland, 2005
- at a glance

Forfás



Introduction

Forfás has responsibility for the collection and publication of research and innovation statistics for Ireland. To this end, Forfás monitors research and development activity in the state, academic and private sectors and publishes the relevant statistical information in the regular publications: *State Expenditure on Science and Technology*; *Survey of Research and Development in the Higher Education Sector* and *Business Expenditure on Research and Development*.

This publication brings together the key facts and figures from these three sectors (state, academic and private) and provides a statistical compilation of Ireland's science and technology activity. This information is based on the latest available data in 2005.

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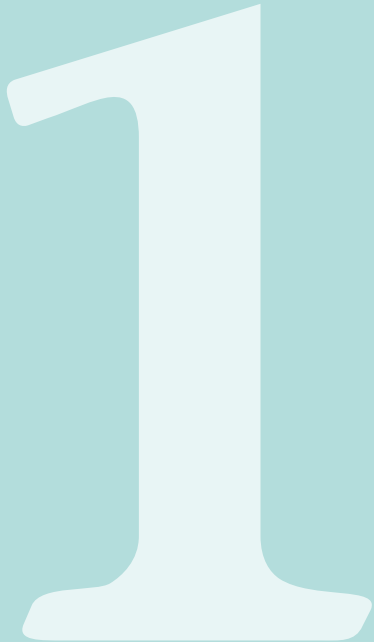
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Other S&T indicators

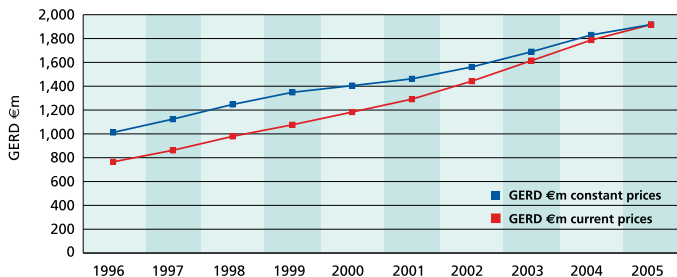
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Section 1

National expenditure on R&D - headline figures



1 Gross Expenditure on R&D (GERD) - Ireland 1996 – 2005 (€m)



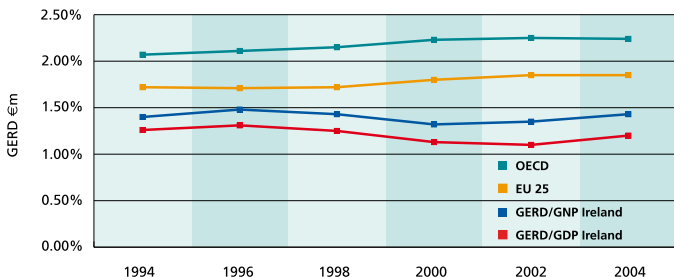
	1996	1997	1998	1999	2000	2001	2002	2003	2004*	2005**
GERD €m	1,004.9	1,116.5	1,239.8	1,341.6	1,397.4	1,454.7	1,554.2	1,682.0	1,822.8	1,910.1
- Constant (2005) prices										
GERD €m	758.0	855.0	972.0	1,069.0	1,176.0	1,284.0	1,435.0	1,607.5	1,780.4	1,910.1
- current prices										

*2004 includes Forfás estimates on business R&D expenditure

**2005 figures are Forfás estimates.

Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás)

2 GERD as a % of GDP/GNP* - Ireland, EU & OECD 1994 – 2004



	1994	1996	1998	2000	2002	2004
OECD	2.07%	2.11%	2.15%	2.23%	2.25%	2.24%**
EU 25	1.72%	1.71%	1.72%	1.80%	1.85%	1.85%***
GERD/GNP Ireland	1.40%	1.48%	1.43%	1.32%	1.35%	1.43%
GERD/GDP Ireland	1.26%	1.31%	1.25%	1.13%	1.10%	1.20%

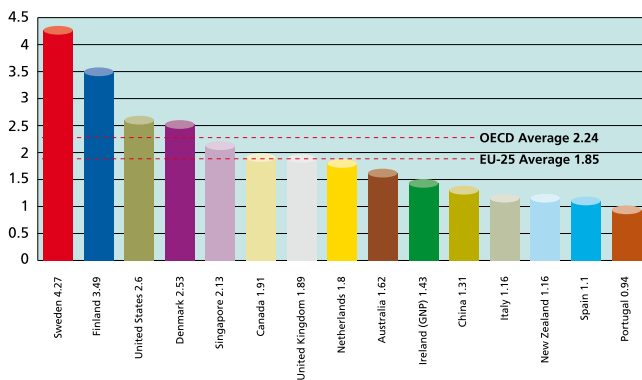
**Latest OECD data is 2003

***Latest EU 25 data is 2003

Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

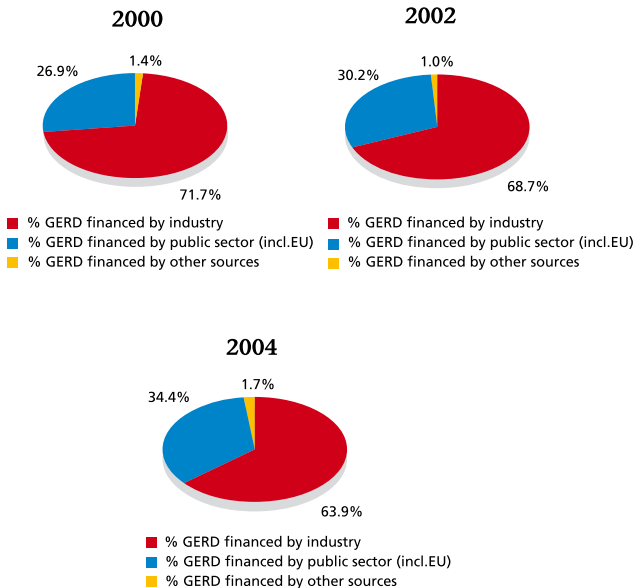
*GDP data in Ireland are inflated by the transfer pricing policies of large multinationals, therefore, the use of GNP as a base is the more relevant measure of economic activity for international benchmarking purposes.

3 GERD as a % of GDP/GNP - Ireland & selected countries, 2004 (or latest available data)



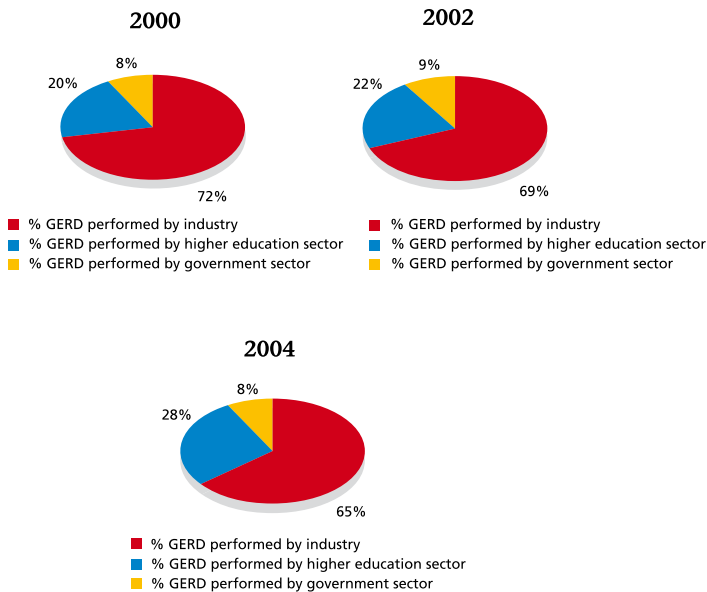
Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

4 Funding sources of National R&D - Ireland 2000, 2002 & 2004



Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás).

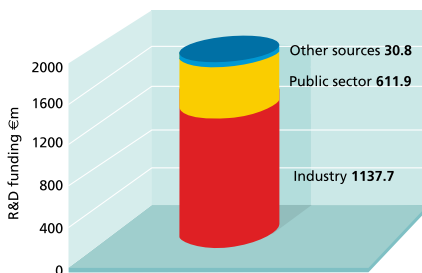
5 Performance of National R&D by sector – Ireland 2000, 2002 & 2004



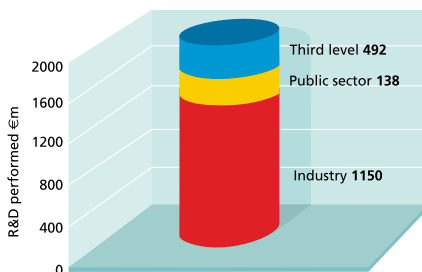
Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás).

6 Comparison of sources & performers of GERD, 2004 (€m)

GERD sources of funding, 2004

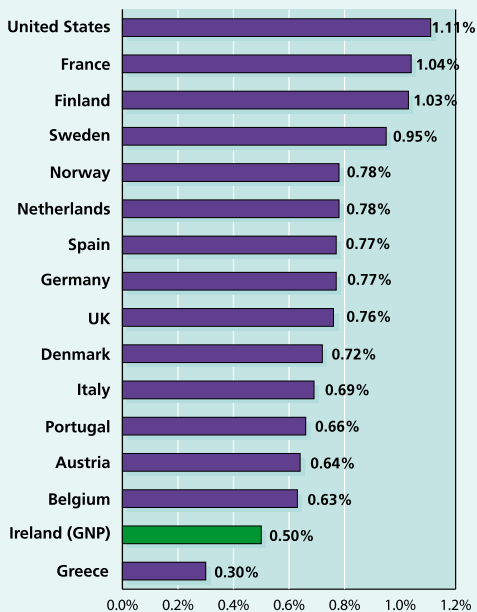


GERD performers, 2004

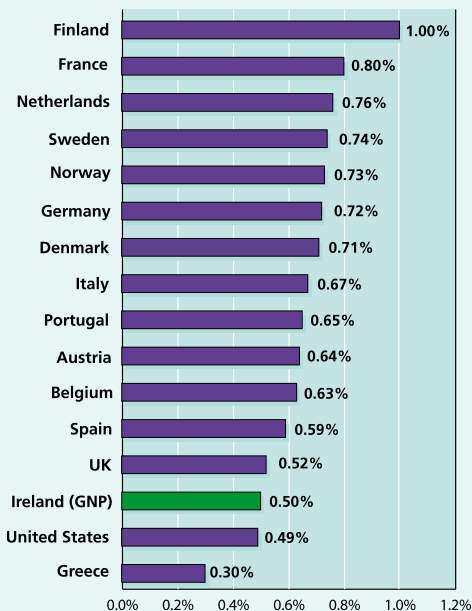


Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfäs); Survey of R&D in the Higher Education Sector, 2004 (Forfäs); State Expenditure on Science & Technology, 2005 (Forfäs).

7 (i) Government Budget Outlays or Appropriations of R&D (GBOARD) as a % of GDP/GNP, 2004



(ii) GBOARD as a % of GDP/GNP less defence, 2004



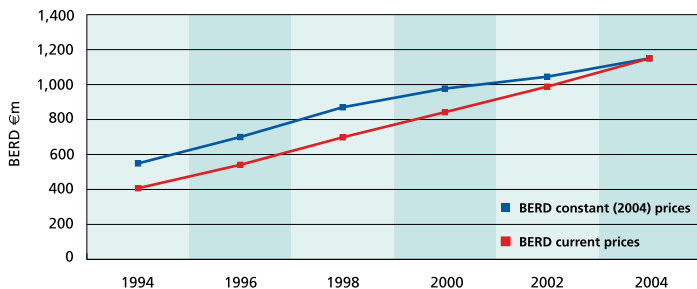
Sources: Derived from the State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

Section 2

**Expenditure on R&D by main sector:
business, third level and public**



8 Business Expenditure on R&D (BERD) in current and constant prices - Ireland 1994 – 2004 (€m)

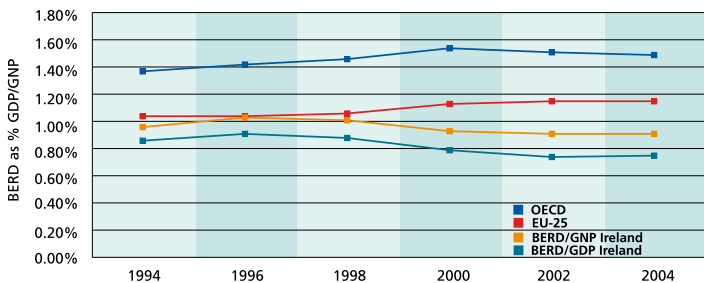


	1994	1996	1998	2000	2002	2004*
BERD €m constant (2004) prices	549	700	870	977	1045	1150
BERD €m current prices	407	541	698	842	988	1150

*2004 figures are Forfás estimates

Source: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás).

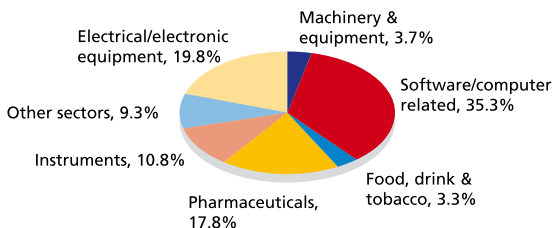
9 BERD as a % of GDP/GNP - Ireland, EU & OECD 1994 - 2004



	1994	1996	1998	2000	2002	2004
OECD	1.39%	1.44%	1.48%	1.56%	1.53%	1.51%
EU-25	1.06%	1.06%	1.08%	1.15%	1.17%	1.17%
BERD/GNP Ireland	0.98%	1.05%	1.03%	0.95%	0.93%	0.93%
BERD/GDP Ireland	0.88%	0.93%	0.90%	0.81%	0.76%	0.77%

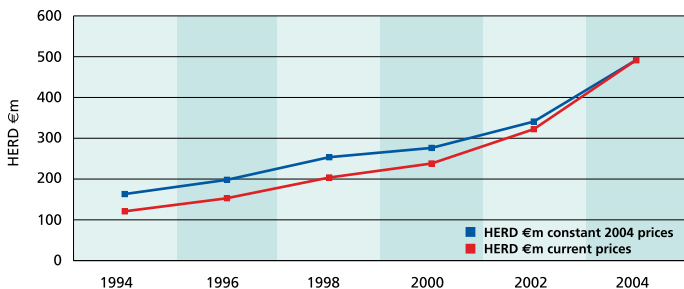
Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

10 BERD by industrial sector, 2003



Source: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás).

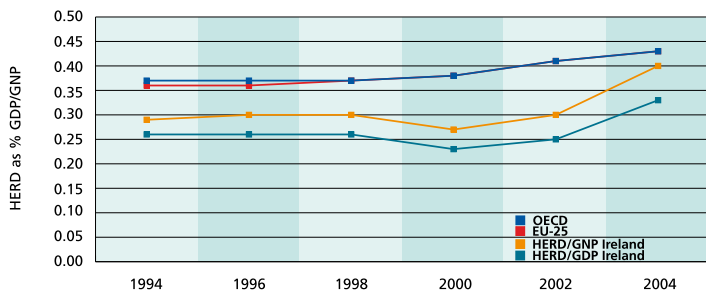
11 Higher Education R&D (HERD) in current and constant prices - Ireland 1994 – 2004 (€m)



	1994	1996	1998	2000	2002	2004*
HERD €m constant (2004) prices	163.2	198.1	253.6	276.3	340.9	491.7
HERD €m current prices	121.1	153.1	203.7	238.1	322.3	491.7

Source: Derived from the Survey of R&D in the Higher Education Sector, 2004 (Forfás).

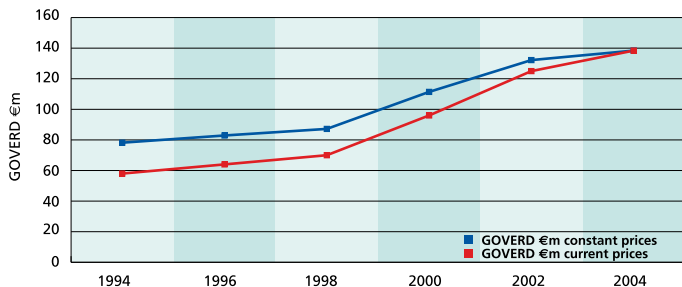
12 HERD as a % of GDP/GNP - Ireland, EU & OECD 1994 - 2004



	1994	1996	1998	2000	2002	2004
OECD	0.37	0.37	0.37	0.38	0.41	0.43
EU-25	0.36	0.36	0.37	0.38	0.41	0.43
HERD/GNP Ireland	0.29	0.30	0.30	0.27	0.30	0.40
HERD/GDP Ireland	0.26	0.26	0.26	0.23	0.25	0.33

Sources: Derived from the Survey of R&D in the Higher Education Sector, 2004 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

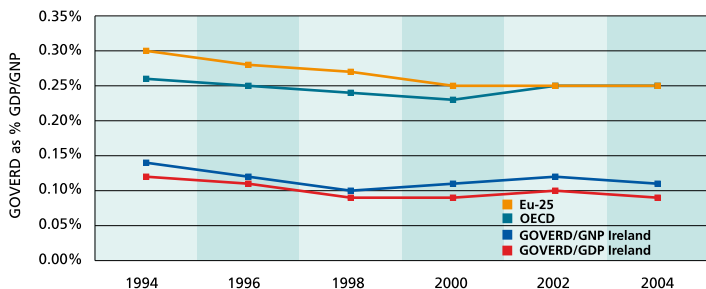
13 Government intramural expenditure on R&D - Ireland 1994 – 2004 (€m)



	1994	1996	1998	2000	2002	2004
■ GOVERD €m constant (2004) prices	78.2	82.9	87.2	111.4	132.2	138.4
■ GOVERD €m current prices	58.0	64.0	70.0	96.0	125.0	138.4

Source: Derived from *State Expenditure on Science & Technology, 2005* (Forfás).

14 Government intramural expenditure on R&D as a % of GDP/GNP - Ireland, EU & OECD 1994 - 2004



	1994	1996	1998	2000	2002	2004
Eu-25	0.30%	0.28%	0.27%	0.25%	0.25%	0.25%
OECD	0.26%	0.25%	0.24%	0.23%	0.25%	0.25%
GOVERD/GNP Ireland	0.14%	0.12%	0.10%	0.11%	0.12%	0.11%
GOVERD/GDP Ireland	0.12%	0.11%	0.09%	0.09%	0.10%	0.09%

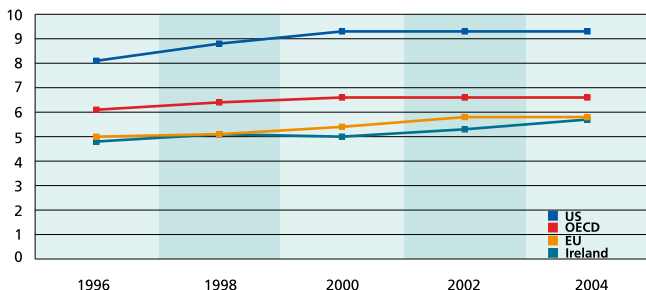
Sources: Derived from *State Expenditure on Science & Technology, 2005 (Forfás)*; *Main Science & Technology Indicators, 2005-1 (OECD)*.

Section 3

R&D workforce

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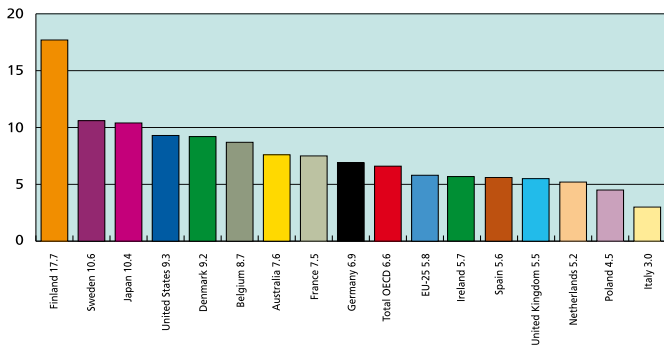
15 Researchers (FTE) per 1000 total employment - Ireland, EU, OECD & US 1996 - 2004 (or latest available data)



	1996	1998	2000	2002	2004	
■ US	8.1	8.8	9.3	9.3	9.3	(latest data = 1999)
■ OECD	6.1	6.4	6.6	6.6	6.6	(latest data = 2000)
■ EU	5.0	5.1	5.4	5.8	5.8	(latest data = 2002)
■ Ireland	4.8	5.1	5.0	5.3	5.7	

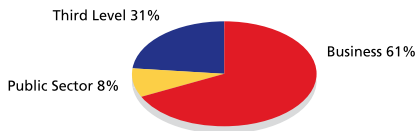
Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

16 Researchers per (FTE) 1000 total employment - Ireland & selected countries, 2004 (or latest available data)

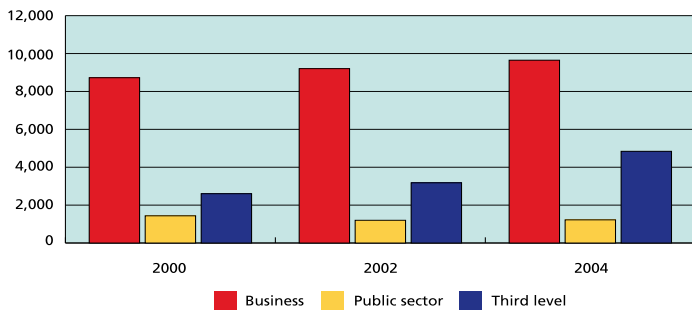


Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

17 R&D personnel (researchers plus support staff) (FTE) by sector of employment – Ireland, 2004

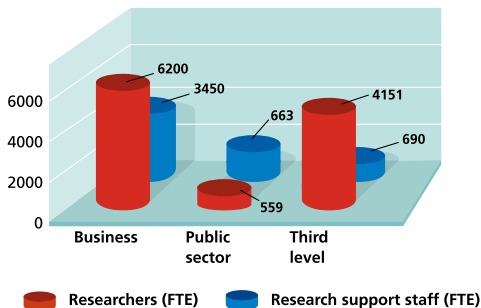


Research personnel = 15,713 FTE



Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás).

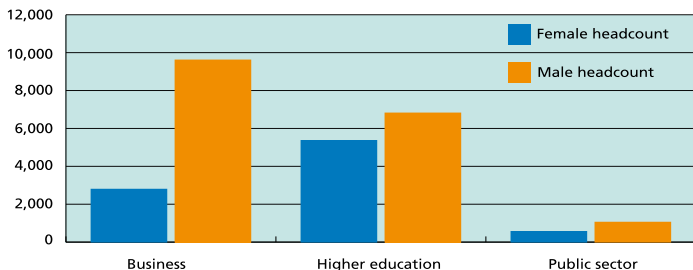
18 R&D personnel (FTE) by sector of employment & category of employment – Ireland, 2004



Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás).

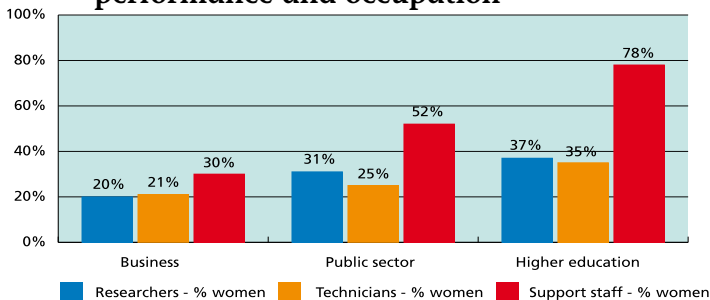
19 Female research personnel (headcount) 2004

(i) male/female researchers by sector of performance

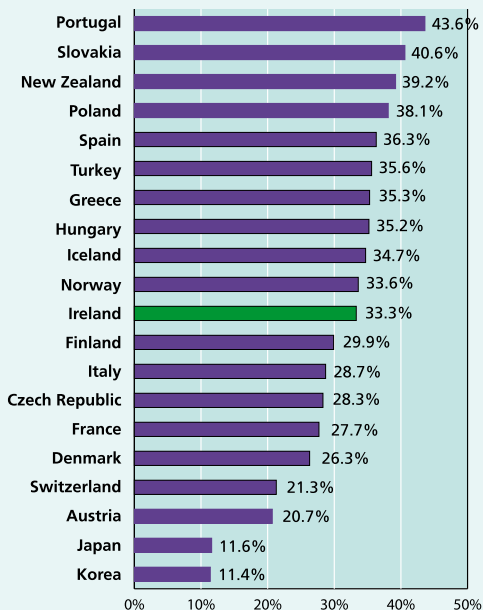


	Female headcount	Male headcount	Total
Business	2,790	9,610	12,400
Higher education	5,363	6,812	12,175
Public sector	560	1,049	1,609

(ii) female research personnel as a % of total research personnel by sector of performance and occupation



(iii) international comparison of female research personnel as a % of total research personnel (all sectors) 2004 (or latest available data)



Sources: Derived from the Survey of R&D in the Business Sector, 2003 (Forfás); Survey of R&D in the Higher Education Sector, 2004 (Forfás); State Expenditure on Science & Technology, 2005 (Forfás); Main Science & Technology Indicators, 2005-1 (OECD).

Section 4

Other S&T indicators

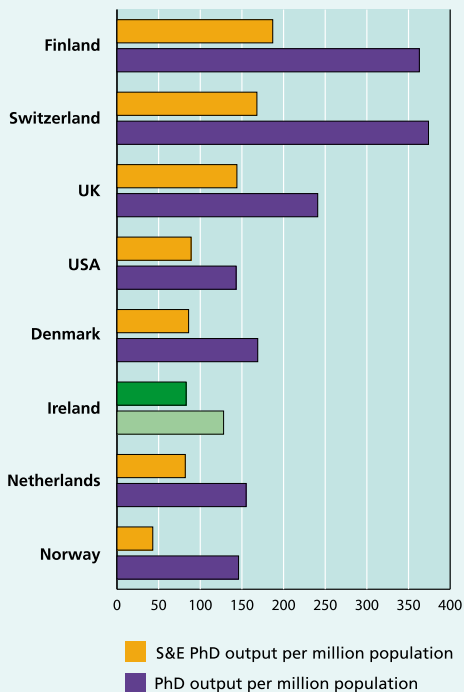
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20 (i) Science & engineering graduates as a % of total graduates - Ireland & selected countries 2001/2002



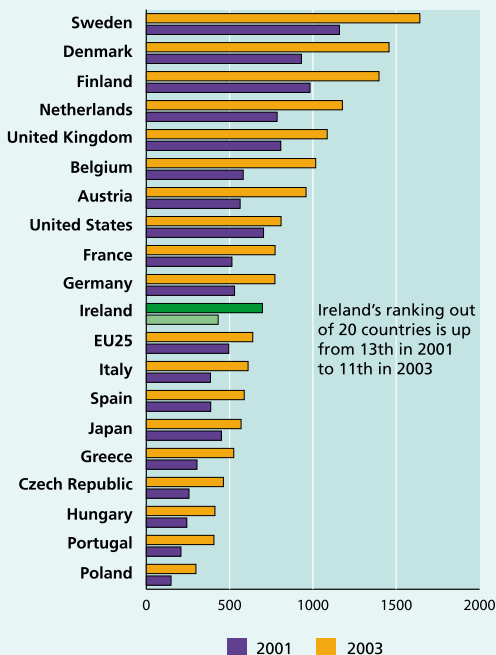
Source: *Science & Technology in Europe, 2005* (Eurostat).

(ii) PhD graduates per million population and science & engineering PhD graduates per million population, 2001



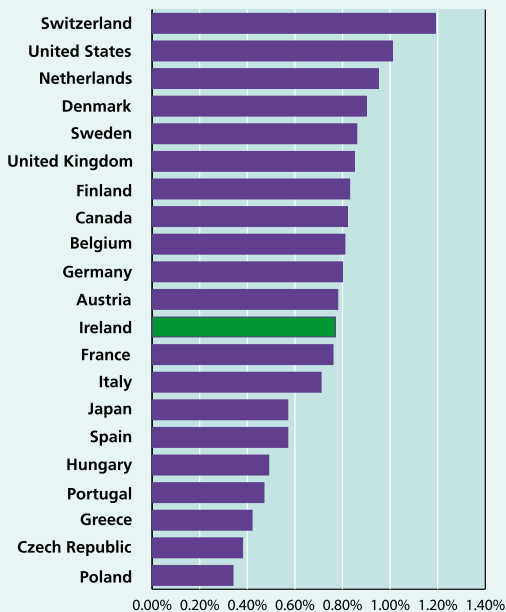
Sources: *Science & Engineering Indicators, 2004* (National Science Foundation).

21 (i) Scientific publications per million population, 2001 and 2003



Sources: *Main Science & Technology Indicators, 2005 (OECD); Science & Engineering Indicators, 2004 (National Science Foundation).*

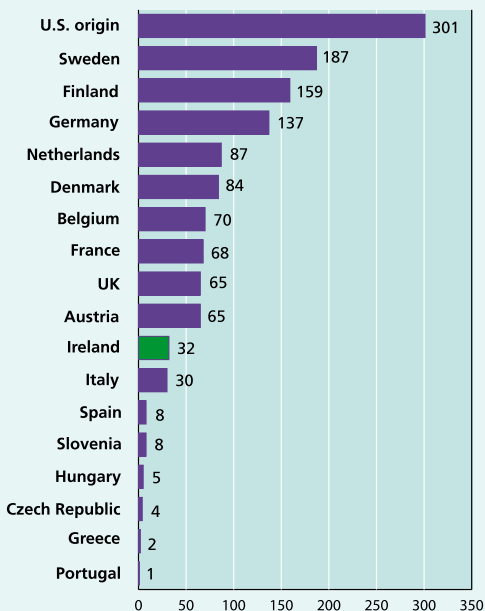
(ii) Percentage of scientific publications that are highly cited, 2001



Source: *Science & Engineering Indicators, 2004* (National Science Foundation).

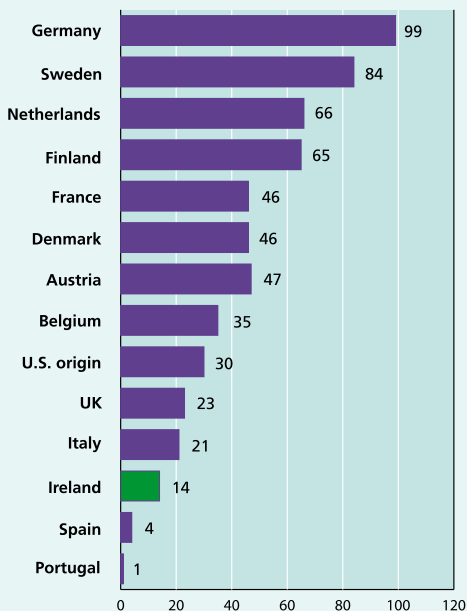
22 Patents granted from Ireland & selected countries per million population to:

(i) USPTO (US Patent & Trademark Office) patents granted per million population, 2002



Source: *Science & Technology in Europe, 2005* (Eurostat).

(ii) EPO (European Patents Office) patents granted per million population, 2001



Sources: *Science & Technology in Europe, 2005* (Eurostat);
Main Science & Technology Indicators, 2005-1 (OECD).

The background features a light green gradient with faint, semi-transparent graphics. On the left, there is a pie chart with several segments. On the right, there is a bar chart with four vertical bars of varying heights. A thick, solid green horizontal bar runs across the bottom of the page.

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