

Research and Development

in Ireland, 2001
- at a glance



Introduction

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

This publication brings together the key facts and figures from these three discrete sectors (state, academic and private) and provides a statistical compilation of Ireland's Science and Technology activity, based on the latest data available in 2003.

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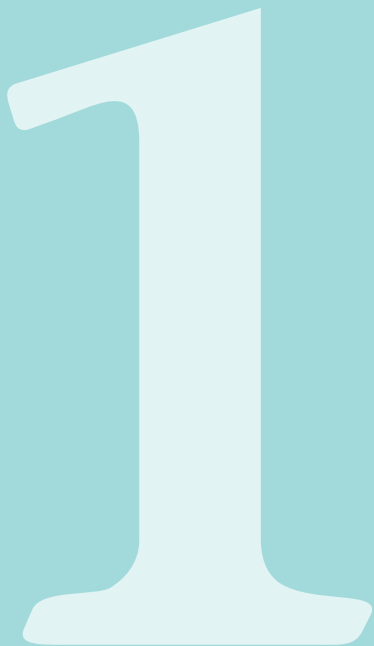
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Expenditure on R&D by Main Sector: Business, Third Level and Public

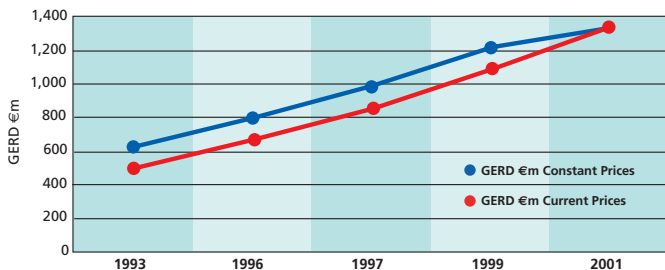
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Section 1

National Expenditure on R&D – Headline figures



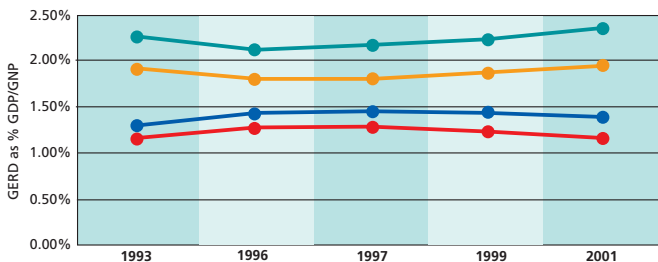
1 Gross Expenditure on R&D (GERD) - Ireland 1993 to 2001



	1993	1995	1997	1999	2001
GERD €m Current Prices	501.8	667.4	856.2	1,097.0	1338.7
GERD €m Constant Prices	626.1	793.7	987.3	1,215.0	1,338.7

Sources: *Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás).*

2 Gross Expenditure on R&D (GERD) as a percentage GDP/GNP* - Ireland, EU and OECD

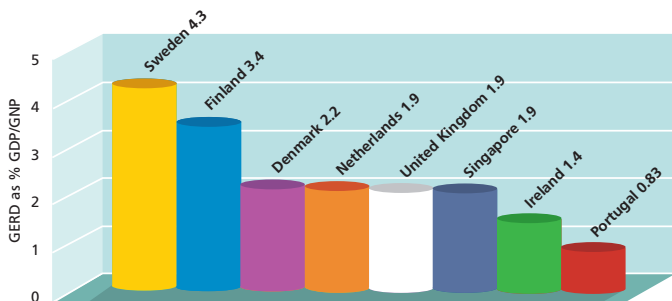


	1993	1995	1997	1999	2001
● GERD/GNP Ireland	1.30%	1.43%	1.45%	1.43%	1.39%
● GERD/GDP Ireland	1.16%	1.27%	1.28%	1.22%	1.17%
● EU	1.92%	1.81%	1.80%	1.86%	1.93%
● OECD	2.25%	2.11%	2.16%	2.21%	2.33%

Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2000 (Forfás); Main Science & Technology Indicators, 1999, Vol 1; 2001, Vol 1; 2003 Vol. 1; (OECD).

*The use of GNP as a base is the more relevant aggregate for Ireland. GDP data in Ireland are inflated by the transfer pricing policies of large multinationals.

3 GERD as % GDP/GNP for Ireland and selected countries, 2001*

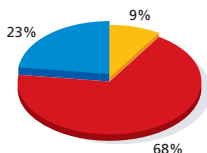


Sources: *Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás); Main Science & Technology Indicators, 1999, Vol 1; 2001, Vol 1; 2003 Vol. 1; (OECD); Singapore R&D 2001 (Agency for Science, Technology and Research, Singapore).*

**2001 data used or latest available year.*

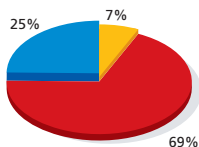
4 Funding sources of National R&D 1995, 1999 and 2001 - Ireland

Funders of GERD 1995



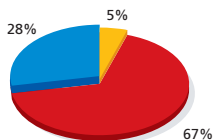
■ % GERD financed by industry
■ % GERD financed by government
■ % GERD financed by other sources

Funders of GERD 1999



■ % GERD financed by industry
■ % GERD financed by government
■ % GERD financed by other sources

Funders of GERD 2001

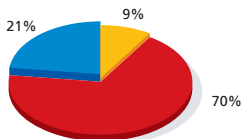


■ % GERD financed by industry
■ % GERD financed by government
■ % GERD financed by other sources

Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás).

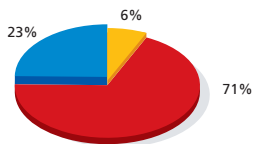
5 Performance of National R&D by Sector 1995, 1999 and 2001 - Ireland

Performers of GERD 1995



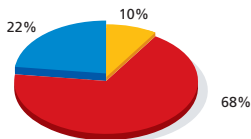
- % GERD performed by industry
- % GERD performed by third level sector
- % GERD performed by government

Performers of GERD 1999



- % GERD performed by industry
- % GERD performed by third level sector
- % GERD performed by government

Performers of GERD 2001

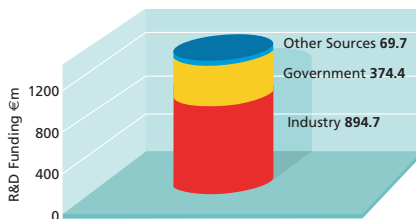


- % GERD performed by industry
- % GERD performed by third level sector
- % GERD performed by government

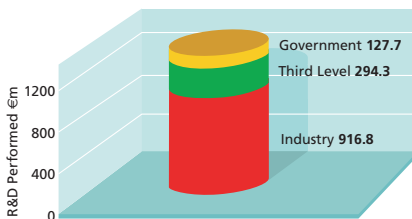
Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás).

6 GERD broken down by Funding Source - Ireland 2001/GERD broken down by Performing Sector - Ireland, 2001

GERD Funding Sources - Ireland 2001

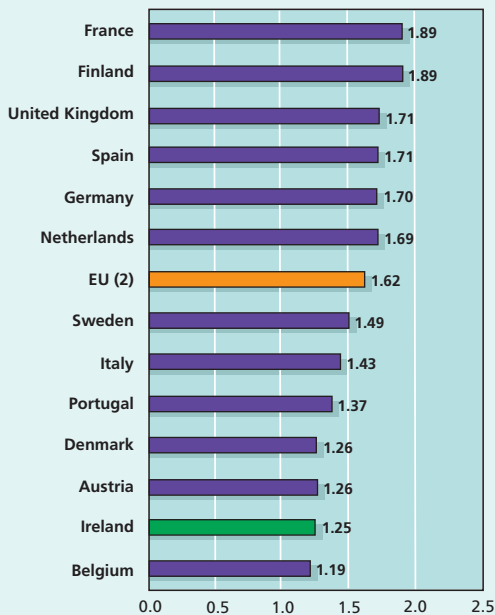


GERD by Performing Sector - Ireland 2001



Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás).

7 Share of Government Budget allocated to R&D, Ireland and selected countries 2001



Notes: (1) IRL, B, D, EL, E, F, FIN, I, SWE, UK, and EU: 2001; DK: 2000;
(2) EU does not include L

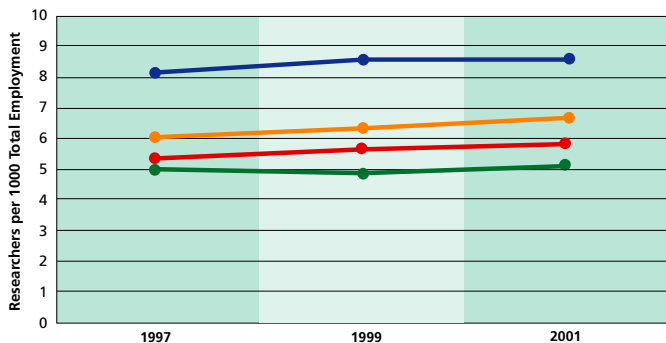
Sources: State Expenditure on Science & Technology, 2001 (Forfás);
Statistics on S&T data 1991-2001, (European Commission 2003 edition);
Forfás STI Indicators Unit.

Section 2

R&D Workforce



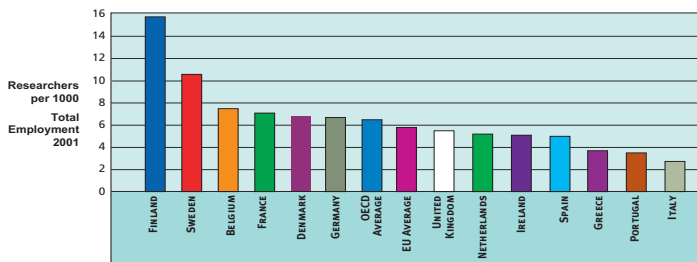
8 Researchers per 1000 Total Employment, Ireland, EU and OECD, 1997, 1999 and 2001



	1997	1999	2001
● US	8.2	8.6	8.6
● EU	5.3	5.6	5.8
● OECD	6.1	6.4	6.5
● Ireland	5.0	4.9	5.1

Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás); Main Science & Technology Indicators, 2003 Vol. 1; (OECD).

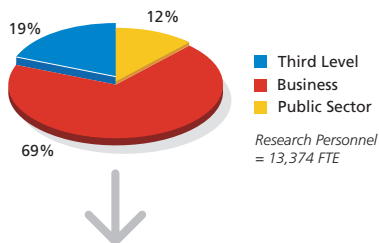
9 Researchers per 1000 Total Employment, Ireland and selected countries: 2001



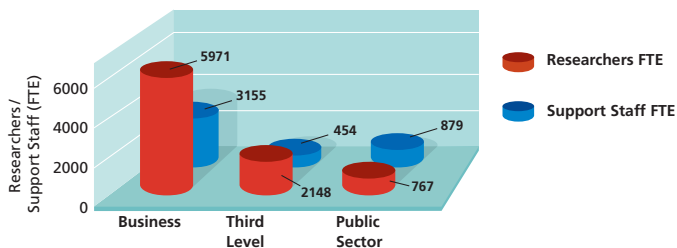
	1997	1999	2001
Finland	12.3	14.5	15.8
Sweden	9.2	9.6	10.6
Belgium	6.6	7.5	7.5
France	6.8	6.8	7.1
Denmark	6.5	6.8	6.8
Germany	6.3	6.7	6.7
OECD Average	6.1	6.4	6.5
EU Average	5.3	5.6	5.8
United Kingdom	5.2	5.5	5.5
Netherlands	5.0	5.1	5.2
Ireland	5.0	4.9	5.1
Spain	3.8	4.0	5.0
Greece	2.9	3.7	3.7
Portugal	2.9	3.3	3.5
Italy	3.0	2.9	2.9

Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás); Main Science & Technology Indicators, 2003 Vol. 1; (OECD).

10 (i) Research & Development Personnel (Full Time Equivalents) 2001 by Sector of Employment

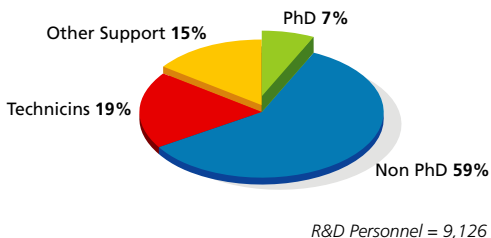


(ii) Numbers of R&D Personnel employed as Researchers and Support Staff 2001 by Sector of Employment



Sources: Derived from Survey of R&D in the Business Sector, 2001 (Forfás); Survey of R&D in the Higher Education Sector, 2000 (Forfás); State Expenditure on Science & Technology, 2001 (Forfás).

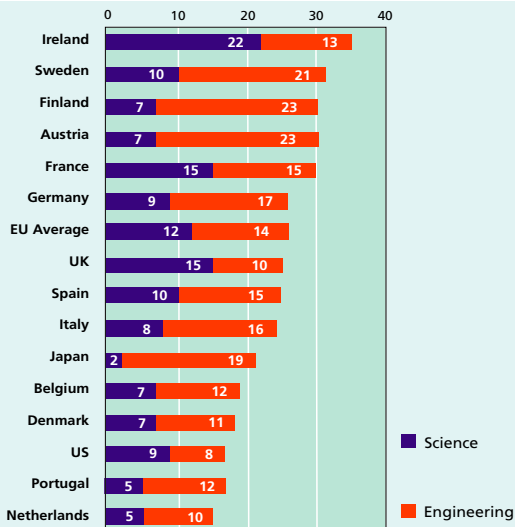
11 Distribution of all personnel (FTE) engaged in in-house R&D in the Business sector, Ireland, 2001



Source:

Derived from Survey of R&D in the Business Sector, 2001 (Forfás).

12 Science & Engineering Graduates (ISCED 5+ISCED 6*) as Percentages of All Disciplines, Ireland and Selected Countries, 2000



Source: *Third European Report on Science & Technology Indicators, 2003, (European Commission).*

* ISCED 5 and ISCED 6 are sub-classified into ISCED 5A, ISCED 5B and ISCED 6 programmes.

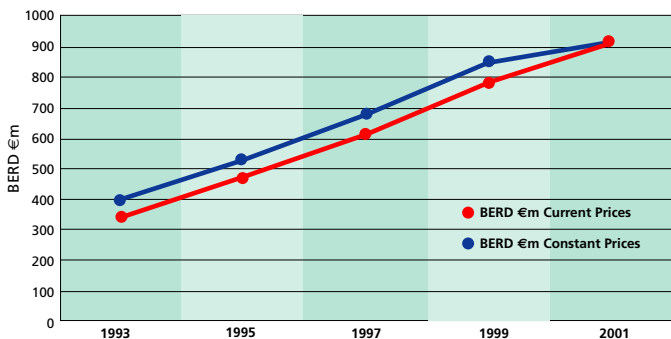
- ISCED 5b = Programmes at the tertiary level that focus on practical, technical or occupational skills for direct entry into the labour market.
- ISCED 5a = Programmes at the tertiary level equivalent to university programmes. (includes Bachelors and Masters)
- ISCED 6 = Advanced research programmes at the tertiary level, equivalent to PhD programmes. (taken from UNESCO definitions).

Section 3

**Expenditure on R&D by Main Sector:
Business, Third Level and Public**

3

13 Business Expenditure on R&D - Ireland, 1993 to 2001

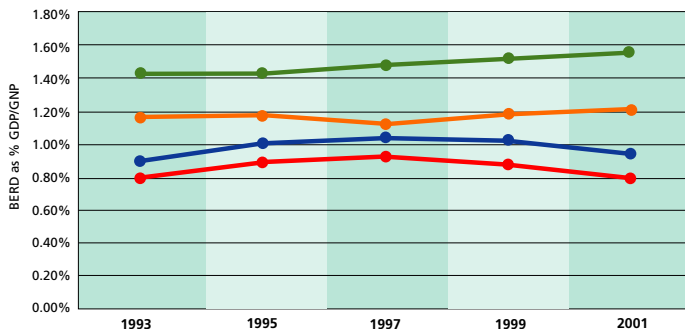


	1993	1995	1997	1999	2001
BERD €m Current Prices	343	470	612	784	917
BERD €m Constant Prices	392	522	679	848	917

Source:

Derived from Survey of R&D in the Business Sector, 2001 (Forfás).

14 Business Expenditure on R&D as a percentage GDP/GNP - Ireland, EU and OECD 1993 to 2001

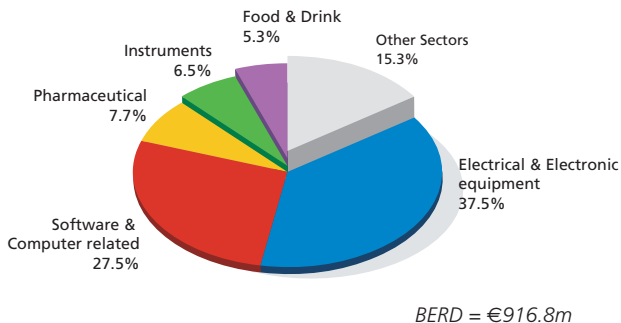


	1993	1995	1997	1999	2001
BERD/GNP Ireland	0.89%	1.01%	1.04%	1.02%	0.95%
BERD/GDP Ireland	0.79%	0.89%	0.91%	0.87%	0.80%
EU	1.18%	1.18%	1.13%	1.19%	1.21%
OECD	1.44%	1.44%	1.48%	1.52%	1.56%

Source:

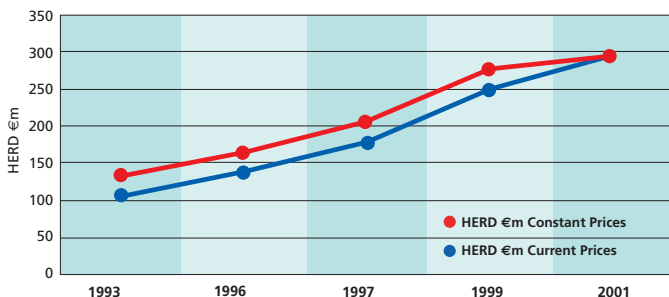
Derived from Survey of R&D in the Business Sector, 2001 (Forfás).

15 Distribution of Business Expenditure on R&D by main Industrial sector, Ireland, 2001.



Source: Derived from Survey of R&D in the Business Sector, 2001 (Forfás).

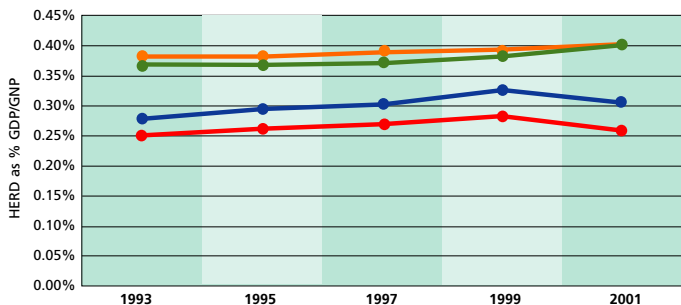
16 Higher Education Expenditure on R&D - Ireland, 1993 to 2001



	1993	1995	1997	1999	2001
● HERD €m Current Prices	107	137	178	249	294
● HERD €m Constant Prices	133	163	206	276	294

Source: Derived from Survey of R&D in the Higher Education Sector, 2000 (Forfás).

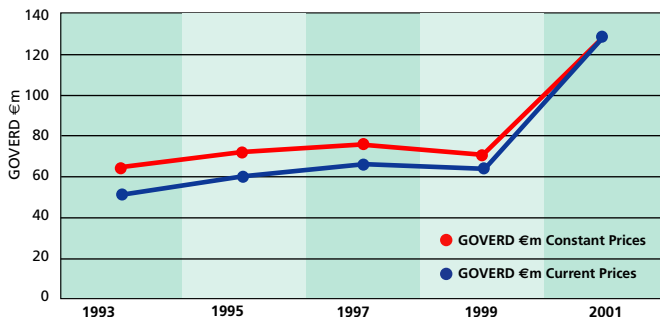
17 Higher Education Expenditure on R&D as a percentage GDP/GNP Ireland, EU and OECD, 1993 to 2001



	1993	1995	1997	1999	2001
● HERD/GNP Ireland	0.28%	0.29%	0.30%	0.33%	0.31%
● HERD/GDP Ireland	0.25%	0.26%	0.27%	0.28%	0.26%
● EU	0.38%	0.38%	0.39%	0.39%	0.40%
● OECD	0.37%	0.37%	0.37%	0.38%	0.40%

Sources: Derived from Survey of R&D in the Higher Education Sector, 2000 (Forfás); Main Science & Technology Indicators, 1999, Vol 1; 2001, Vol 1; 2003 Vol. 1; (OECD).

18 Government Intramural Expenditure on R&D - Ireland 1993 to 2001

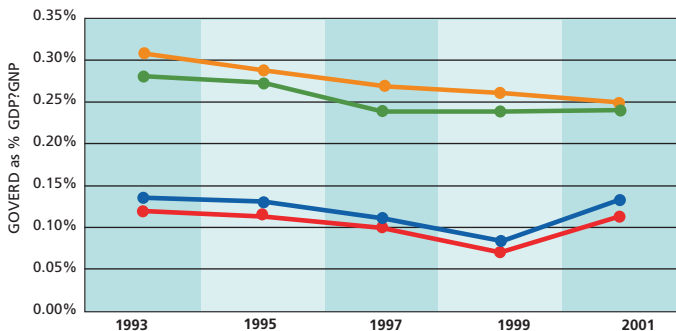


	1993	1995	1997	1999	2001
GOVERD €m Current Prices	51.5	60.2	65.4	63.9	127.7
GOVERD €m Constant Prices	64.3	71.6	75.4	70.8	127.7

Source:

Derived from State Expenditure on Science & Technology, 2001 (Forfás)

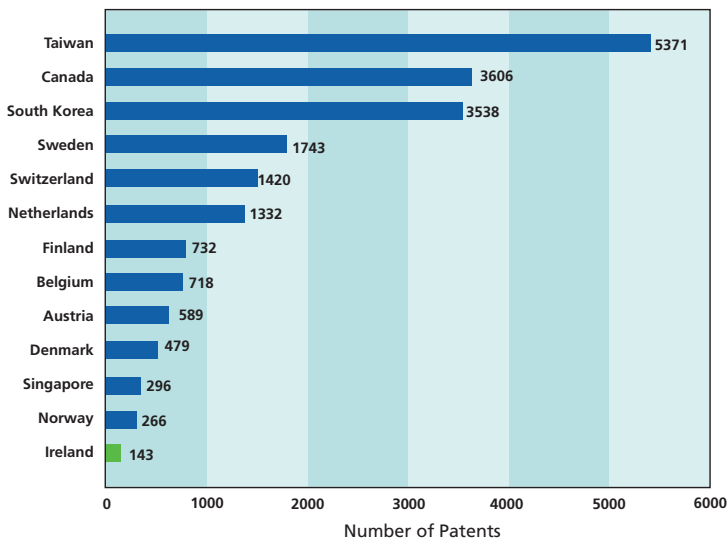
19 Government Intramural Expenditure on R&D as a % GDP/GNP, Ireland, EU and OECD 1993 to 2001



	1993	1995	1997	1999	2001
GOVERD/GNP Ireland	0.13%	0.13%	0.11%	0.08%	0.13%
GOVERD/GDP Ireland	0.12%	0.11%	0.10%	0.07%	0.11%
EU	0.31%	0.29%	0.27%	0.26%	0.25%
OECD	0.28%	0.27%	0.24%	0.24%	0.24%

Sources: Derived from *State Expenditure on Science & Technology, 2001 (Forfás)*; *Main Science & Technology Indicators, 1999, Vol 1; 2001, Vol 1; 2003 Vol. 1*; (OECD).

20 USA Patents Granted, by Residence of Inventor, 2001



Source: USPTO utility patents

(www.uspto.gov/web/offices/ac/ido/oeip/taflst_co_01.htm)

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