

State Expenditure on Science & Technology, 2001

*Volume Two – The Research and
Development Element of the
Science and Technology Budget*

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Executive Summary

Vol. 2. Research and Development in the Public Sector

Financial allocation by Government for 2001 to institutions involved in R&D.

As research and development is a very important component of total S&T spend, a separate report on R&D is prepared in addition to the Total S&T Budget report. This analyses both the funding of R&D by government departments/agencies (whether performed in the public sector or the private sector) and the performance of R&D in the public sector. Forfás prepares separate reports on the performance of R&D in the business sector ('BERD') and in the higher education sector ('HERD').

The table below shows the total allocations for R&D for both 2000 and 2001, as well as the outturn for 2000.

Public Funding of R&D, 2000-2001 (€m)

	2000 Allocation	2000 Outturn	2001 Allocation
Exchequer	201.05	175.78	285.09
EU	94.77	68.28	56.74
Total Public	295.68	244.06	341.84
Earned income	73.08	76.88	75.07
Total	368.90	320.95	416.90

The table below indicates the areas where the major changes in expenditure occurred.

Major Changes in R&D Expenditures (€m)

	2000 Outturn	2001 Allocation	Change
Dept. of Education & Science	82.5	121.6	+39.1
Dept. of Enterprise, Trade & Employment	61.6	89.5	+27.9
Dept. of Public Enterprise	7.4	18.0	+10.6
Dept. of Agriculture & Food	51.1	58.6	+7.5
Dept. of Marine & Natural Resources	13.6	21.0	+7.4
Dept. of Health & Children	12.5	15.6	+3.1

Allocations of public funds to research and development by government departments and their agencies in 2001 amounted to €341.8m. This compares with an original allocation of €295.7m in 2000 and an outturn for 2000 of €244.1m. The difference between allocation and outturn in 2000 reflected a variety of factors. On the one hand, the outturn for the Department of Enterprise, Trade and Employment was nearly 50% below allocation (€61.6m instead of €120.2m); this was caused mainly by the slower than expected build up in Science Foundation Ireland (shortfall of €31m) as well as an underspend of €17.5m by Enterprise Ireland. On the other hand, additional unanticipated expenditures by the Department of Public Enterprise (+€6m for the Digital

Hub/MediaLab Europe) and the Department of Marine & Natural Resources (+€9m for the construction of the Celtic Explorer Research Vessel) contributed to reducing the overall shortfall between allocation and outturn that year to €51.6m

The allocations for 2001 are up by 40%, or €98m, on 2000 outturn figures and by 15%, or €46m, compared to the original 2000 allocations. The major contributors to this increased funding are:

- ▶ Department of Education and Science: €39.1m
- ▶ Department of Enterprise, Trade and Employment: €28m
- ▶ Department of Public Enterprise: €10.6m

Other significant increases are in the Department of Agriculture, Food and Rural Development (€7.5m), the Department of the Marine and Natural Resources (€7.5m), and the Department of Health and Children (€3.1m).

Additional funding from the Department of Education and Science relates to expenditures under the Programme for Research in Third Level Institutions. The Department of Enterprise, Trade and Employment increase reflects a build up in expenditures to Forfás to fund Science Foundation Ireland as well as additional grants for R&D from Enterprise Ireland to the business sector and to third level institutions. The Department of Public Enterprise has begun to support R&D in a significant way in the Digital Hub and in MediaLab Europe.

The levels of R&D performed in the various Government Departments and their agencies are different from the amounts of R&D they fund. An individual Department or its agencies might perform little or no R&D themselves while providing funding to other performers in either the public or private sectors.

The allocation for performance of R&D in 2001 is €127.7m, up from €95.6m in 2000. This figure includes €13.1m, which is earned income so that the public funds invested in R&D performed in the public sector amount to €114.6m in 2001, compared with €82.7m in 2000.

1 Introduction

The role of research has become increasingly relevant in modern society where the complexity and technology content of most activities offers significant opportunities for innovation based solutions to complex problems. The R&D element of the government's STI expenditure is important because it is the most discretionary component when compared to other Government expenditures in support of regulatory and statutory functions.

Research and development (R&D) in all countries is performed in three distinct sectors of the economy – the business sector, the universities and technological institutes of the third level sector, and the government sector. The State both funds R&D activities performed in all three sectors and also arranges for R&D to be performed within the state sector in order to promote its own strategic objectives. This section examines both performance and funding of R&D by the State.

2 Funding Of R&D by the State

Table 1 shows the Government funding of R&D, which can be performed either in the Government sector itself (as discussed in section 3 below), in the business sector or in third level education colleges. The total allocation is €341.8m, up from €244.1m in 2000 (an increase of 40%).

Table 1 *Public Funding of Research & Development*

Funding Dept./Agency	Allocating Organisation	2000			2001		
		Exchequer €'000	CSF €'000	Public Funding €'000	Exchequer €'000	CSF €'000	Public Funding €'000
Education & Science	Higher Education Authority	51,862		51,862	80,407		80,407
	Education & Science	21,733	7,238	28,970	30,825	8,723	39,549
	DIAS	1,301	291	1,591	1,440	83	1,523
	ESRI	116		116	126		126
Sub-total		75,012	7,528	82,540	112,799	8,806	121,605
Enterprise, Trade & Employment	Enterprise Ireland	7,895	34,525	42,421	20,229	27,190	47,420
	Higher Education Authority	3,990	4,777	8,766	5,172	10,795	15,967
	Forfás	536		536	11,084		11,084
	IDA Ireland	13	3,115	3,127	8,952		8,952
	Shannon Development	499	4,167	4,666	502	2,286	2,787
	FÁS	1,651		1,651	1,839		1,839
	Údarás na Gaeltachta			0	1,270		1,270
	ESRI	87		87	125		125
	Dept. Enterprise, Trade & Employment	306		306	37		37
	DIAS	80		80	5		5
Sub-total		15,056	46,584	61,640	49,213	40,271	89,484
Agriculture & Food	Teagasc	28,334		28,334	40,077		40,077
	Dept. of Agriculture & Food	9,907	5,845	15,752	13,113	102	13,215
	Higher Education Authority	1,746	5,240	6,986	1,338	4,016	5,354
Sub-total		39,987	11,085	51,072	54,529	4,118	58,647
Marine & Natural Resources	Marine Institute	9,698	312	10,011	9,399	268	9,667
	Bord Iascaigh Mhara	2,039		2,039	8,390		8,390
	Údarás na Gaeltachta			0	1,524		1,524
	COFORD	600	390	990	843		843
	Higher Education Authority	168	504	672	75	225	300
	Teagasc			0	232		232
	DIAS			0	36		36
	Enterprise Ireland	-58		-58			0
Sub-total		12,447	1,207	13,653	20,499	493	20,991

Table 1 *Public Funding of Research & Development*

Funding Dept./Agency	Allocating Organisation	2000			2001		
		Exchequer €'000	CSF €'000	Public Funding €'000	Exchequer €'000	CSF €'000	Public Funding €'000
Public Enterprise	Public Enterprise	6,158		6,158	16,435		16,435
	MET Éirann	919	10	929	1,273		1,273
	R.P.I.I.	266		266	323		323
Sub-total		7,344	10	7,354	18,031		18,031
Health & Children	Health Research Board	11,345		11,345	14,126		14,126
	Dept. Health & Children	639		639	779		779
	ESRI	485		485	675		675
Sub-total		12,469		12,469	15,579		15,579
Environment & Local Govt.	Higher Education Authority		1,571	1,571		2,863	2,863
	EPA	504	295	798	418	190	609
	National Roads Authority	734		734	493		493
	ESRI	12		12	443		443
	Environment & Local Govt.	169		169	160		160
Sub-total		1,418	1,865	3,284	1,514	3,054	4,568
Social, Community & Family Affairs	Social, Community & Family Affairs	3,379		3,379	4,342		4,342
	ESRI	290		290	215		215
	Sub-total	3,668		3,668	4,557		4,557
Arts, Heritage Gaeltacht & the Islands	Dept. of Arts, Heritage, Gaeltacht & the Islands	1,625		1,625	3,868		3,868
	National Museum of Ireland	221		221	226		226
	Údarás na Gaeltachta	3,073		3,073	381		381
Sub-total		4,919		4,919	4,475		4,475
Finance	ESRI	2,328		2,328	2,581		2,581
Sub-total		2,328		2,328	2,581		2,581
Taoiseach	NESC	597		597	729		729
Sub-total		597		597	729		729
Central Bank	Central Bank	540		540	589		589
Sub-total		540		540	589		589
Total		175,785	68,280	244,064	285,094	56,741	341,836
% Total		72%	28%	100%	83%	17%	100%

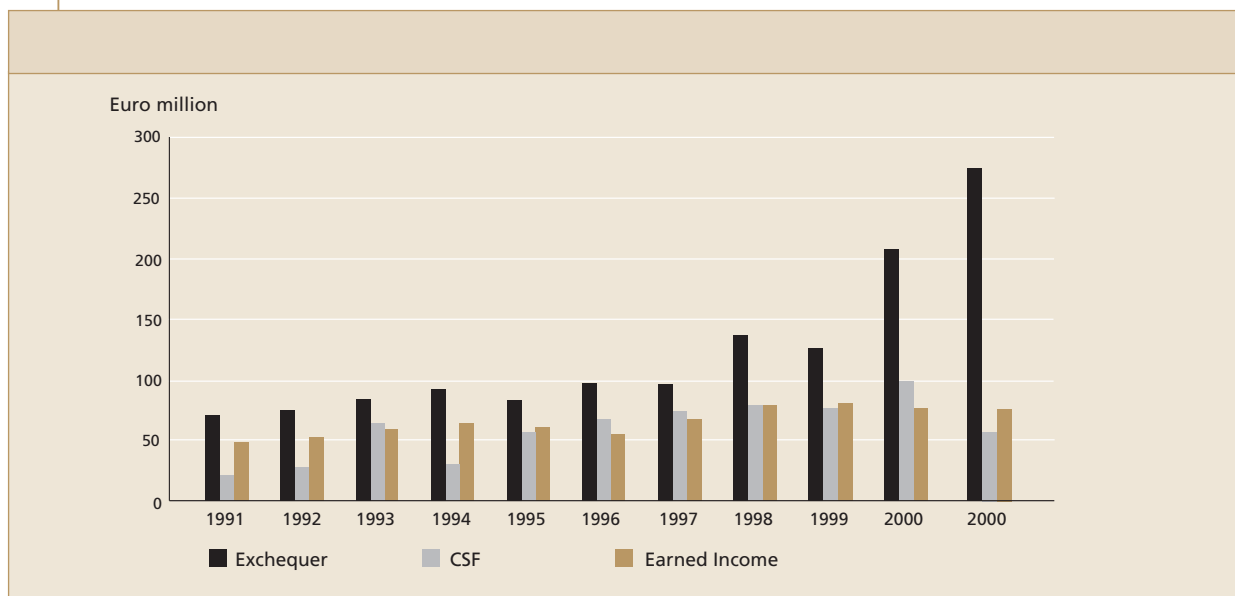
* Public Funds are Exchequer plus CSF

The anticipated level of funding in 2001 shows an increase of €97.8m over the 2000 outturn. The major increases in allocations relate to additional allocations by the:

- ▶ Department of Education and Science - €39.1m for research in the third level institutions.
- ▶ Department of Enterprise, Trade and Employment - €27.9m, including €10.5m for Science Foundation Ireland; €5.8m for IDA Ireland for R&D grant assistance; and €4.9 for Enterprise Ireland for research in the business and higher education sectors.
- ▶ Department of Public Enterprise - €10.6m (of which €5m (capital) was allocated for MediaLab Europe)
- ▶ Department of Agriculture, Food & Rural Development via Teagasc - €7.5m (for research in the fields of agricultural production and food processing)
- ▶ Department of Marine and Natural Resources via Bord Iascaigh Mhara - €7.4m was allocated for fisheries research

Figure 1 depicts the sources of funds for total R&D expenditure over the past decade. The most notable aspect is the fact that exchequer funding has significantly increased its percentage of the total funding from 50% in 1991 to 68% in 2001, which is an increase in real terms of €212m (292%) since 1991. This represents an annual growth rate of 14.6% change over the last decade in exchequer funding. The contribution of EU Community Support Framework programmes has decreased in real terms from €81m in 1998 to €57m in 2001.

Figure 1 Sources of Total R&D Funding 1991-2001 (2001prices, €m)



3 Performance of R&D in the Public Sector

Table 2 gives the profile of R&D performance in the public sector. The total 2001 allocation is €127.7m, representing about 0.4% of total government budget allocations of over €31 billion. Nearly €13.1m of the total comes from earned income, so that the public investment in R&D, which is performed in the state sector, is €114.7m. Total exchequer R&D support increased by €38.6m (51.4%) in 2001 from €75m in 2000. This offsets the decrease in funding of €6.6m (an 86.3% decrease) from the CSF programmes over the same period.

Table 2 *Performance of Research & Development in the Public Sector*

Performing Department/Agency	2000 Source of Funds					2001 Source of Funds				
	Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total	Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total
Department of Agriculture	9,818	5,845	583	16,246	17.0%	12,942	102	539	13,583	10.6%
- Teagasc	28,334		7,504	35,838	37.5%	40,310		7,715	48,024	37.6%
Dept. Public Enterprise	6,158			6,158	6.4%	16,435			16,435	12.9%
- Met Éirann	919	10	248	1,177	1.2%	1,273		301	1,574	1.2%
- R.P.I.I.	266		128	394	0.4%	323		102	425	0.3%
Dept. Marine & Natural Resources										
- Marine Institute	9,698	312		10,011	10.5%	9,399	268		9,667	7.6%
- COFORD	600	390		990	1.0	843			843	0.7%
- BIM	2,039			2,039	2.1%	8,390			8,390	6.6%
- Central & Regional Fisheries Board										
Department of Health & Children	639			639	0.7%	779			779	0.6%
- Health Research Board	2,371		1,414	3,785	4.0%	5,565		1,971	7,536	5.9%
Dept. Enterprise, Trade & Employment	283			283	0.3%					
- FÁS	1,651			1,651	1.7%	1,839			1,839	1.4%
- Enterprise Ireland	241	499	255	995	1.0%	367	406		773	0.6%
- MAC			652	652	0.7%			1,015	1,015	0.8%
Dept. Environment & Local Govt,	123			123	0.1%	110			110	0.1%
- EPA	504	295	131	929	1.0%	418	190	90	698	0.5%
- National Roads Authority	734		95	829	0.9%	493		13	505	0.4%
Dept. Finance										
- ESRI	3,318		1,426	4,744	5.0%	4,165		1,082	5,247	4.1

Table 3 Performance of Research & Development in the Public Sector

Performing Department/Agency	2000 Source of Funds					2001 Source of Funds				
	Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total	Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total
Dept. Social, Community & Family Affairs	3,379		26	3,404	3.6%	4,342		92	4,434	3.5%
Dept. Education & Science										
- DIAS	1,381	291	392	2,063	2.2%	1,481	83	139	1,703	1.3%
Dept. Arts, Heritage, Gaeltacht & the Islands	1,244			1,244	1.3%	2,598			2,598	2.0%
- Natural History Museum	221			221	0.2%	226			226	0.2%
Dept. Taoiseach										
- NESC	597		13	609	0.6%	729		6	735	0.6%
Central Bank	540			540	0.6%	589			589	0.5%
Total	75,057	7,642	12,867	95,566	100%	113,615	1,049	13,063	127,728	100%

R&D performed in the public sector (known as GOVERD) has increased by €56.9m (80%) in real terms since 1999 to €127.7m in 2001. This represents an annual growth rate of 34.3% between 1999 and 2001. In 2001 it amounted to €127.7m or 0.11% of Gross Domestic Product (GDP). Figure 2a shows the trend since 1995.

Figure 2a Expenditure on R&D performed in the public sector as a percentage of Gross Domestic Product (GDP), 1995-2001

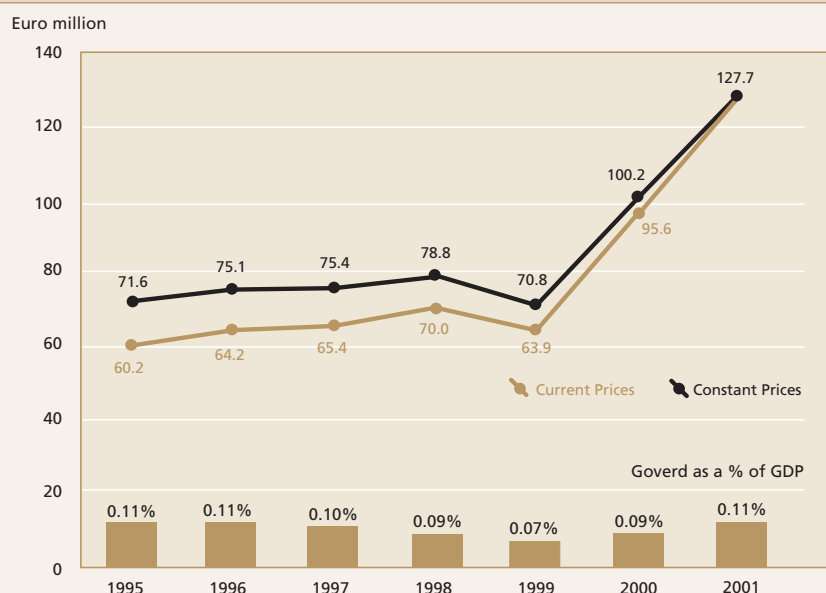
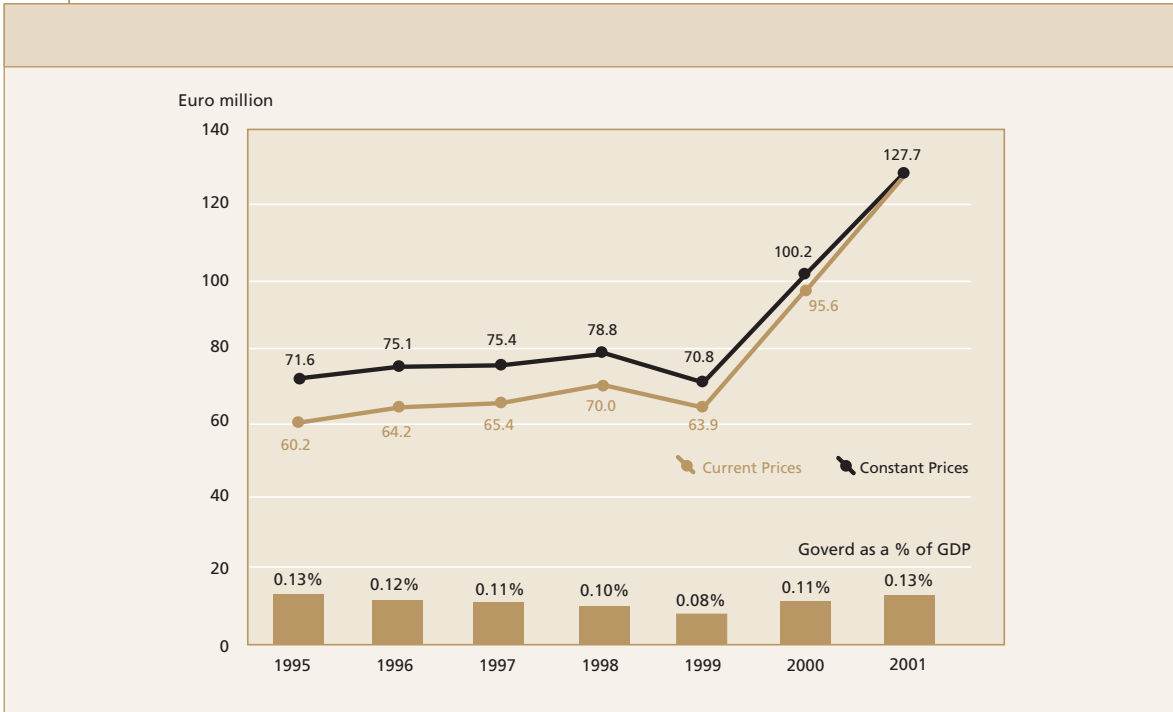


Table 2b below shows the trend since 1995 of performance of R&D in the public sector as a percentage of Gross National Product (GNP). GNP may be a more appropriate measure of the economy's growth as it excludes 'net income factor' which takes into account the profit repatriation of multi-national firms. GOVERD as a percentage of GNP amounts to 0.13 % in 2001.

Figure 2b *Expenditure on R&D performed in the public sector as a % of Gross National Product (GNP), 1995-2001*



The major public sector performers (with expenditure of at least €5m in 2001) are shown in Figure 3. The seven major R&D performers below account for 86% (€108.8m) of GOVERD. The most significant performer of R&D is Teagasc accounting for 37% of the total R&D performance in 2001. The research budget for Teagasc in 2001 is €48.0m, compared to €35.8m in 2000. This relates to research to the value of €34.3m in sustainable agriculture and rural development and €13.7m to food research in 2001. Exchequer funding for Teagasc increased by 42% in 2001, from €28.3m in 2000. Figure 4 below shows the sources of R&D funding for Teagasc over the last decade.

The Department of Public Enterprise is performing research to the value of €16.4m in 2001, of which €5m is capital expenditure for MediaLab Europe. The Department of Agriculture & Food performs a further €13.6m of R&D in its food related research. The Marine Institute performs research to the value of €9.7m. Bord Iascaigh Mhara accounts for €8.4m, a fourfold increase over the 2000 outturn. The Health Research Board and the ESRI performs €7.5m and €5.2m respectively.

Figure 3 Major Public Sector Performers in 2001, expenditure > €5m

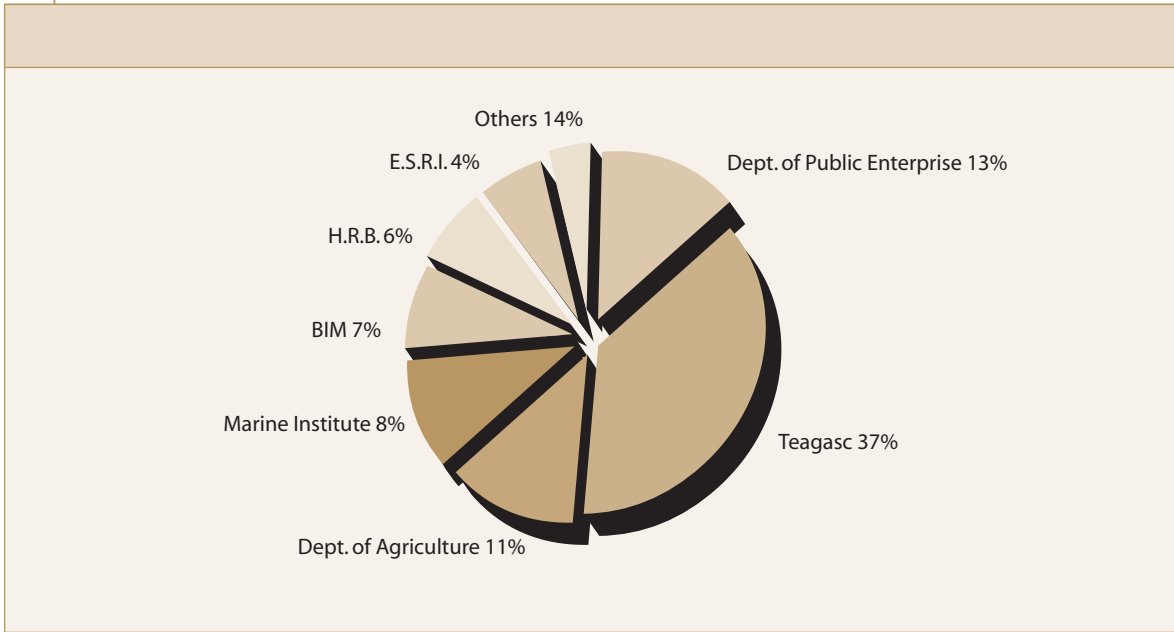
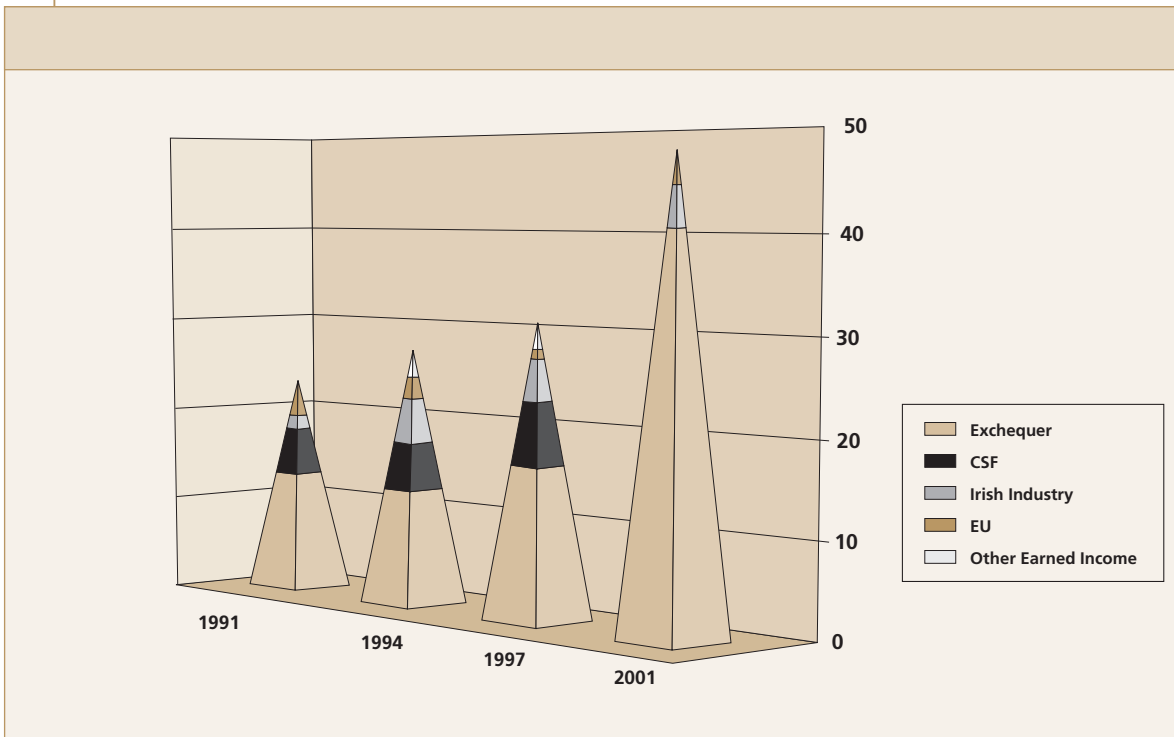


Figure 4: Teagasc R&D by Source of Funds, current prices



4 International Comparisons on Public Sector R&D

It is useful to benchmark Ireland's relative position in comparison to other countries in order to assess our performance to date. It must be mentioned that taking these indicators in isolation may give a false impression of the underlying research scene. Indicators only give a partial view of the reality. In addition, many indicators do not reflect the quality or efficiency of countries in particular areas. For example, a high R&D intensity does not necessarily imply that R&D inputs are efficiently used.

Table 3 shows both the performance of R&D in the public sector¹ and the total Government funding of R&D (the Government fund R&D performed in the public sector in addition to the business sector and the higher education sector), both expressed as a percent of GDP (GNP for Ireland).

Table 3 *R&D Performance and Funding by the Government Sector for selected countries (2001 or nearest year)*

	Government Funding of Civil R&D (as a %GDP)	R&D Performed in the Public Sector (as a % GDP)
Finland	0.96	0.37
Netherlands	0.76	0.34
Sweden	0.75	0.13
France	0.72	0.38
Denmark	0.70	0.31
Norway	0.66	0.26
Portugal	0.63	0.21
United Kingdom	0.43	0.20
Ireland (2001) (GNP)	0.38	0.13
Greece	0.32	0.15

Source: OECD

There is some variation in approaches and results between the different countries. Most of the countries have a similar profile, performing a significant level of R&D in the public sector and funding still more in other sectors. Ireland has a tradition of having very little R&D performed in the public sector with the significant investment being carried out in the business and higher education sectors.

¹ In this report reference to R&D performed in the public sector includes state departments, agencies and other institutions but does not include the third level institutions or universities, except when specified.

Publication List

The 4th Framework Programme in Ireland	April 2001
Commercialisation of Publicly Funded Research <i>Irish Council for Science, Technology & Innovation (ICSTI)</i>	April 2001
The Third Report of the Expert Group on Future Skills Needs <i>Responding to Ireland's growing skill needs</i>	July 2001
Forfás Annual Report 2000	August 2001
Annual Employment Survey 2000	September 2001
Statement of Outward Direct Investment	October 2001
State Expenditure on Science & Technology, 2000	December 2001
Research and Development in the Public Sector, 2000	December 2001
Key Waste Management Issues in Ireland	December 2001
Annual Competitiveness Report, 2001 & The Competitiveness Challenge <i>National Competitiveness Council</i>	December 2001
The Labour Market Participation of Over 55s in Ireland <i>Expert Group on Future Skills Needs</i>	January 2002
International Trade and Investment Report	February 2002
Biotechnology <i>Irish Council for Science, Technology & Innovation (ICSTI)</i>	February 2002
Enlargement of the European Union Forfás Submission to the National Forum on Europe	February 2002
Broadband Investment in Ireland	March 2002
Research & Development in the Business Sector 1999	May 2002
Comparative Consumer Prices in the Eurozone & Consumer Price Inflation in the Changeover Period	June 2002
Forfás Annual Report, 2001	July 2002
e-Business: Where we are and where do we go from here	August 2002
Measuring and Evaluating Research <i>Irish Council for Science, Technology & Innovation (ICSTI)</i>	August 2002
Legislating for Competitive Advantage in e-Business and Information Communications Technologies	October 2002
A Strategy for the Digital Content Industry in Ireland	November 2002
Annual Competitiveness Report 2002 and The Competitiveness Challenge Report <i>National Competitiveness Council (NCC)</i>	November 2002

Functions of Forfás

Is é Forfás an bord náisiúnta um polasaí agus comhairle le haghaidh fiontraíochta, trádála, eolaíochta, teicneolaíochta agus nuála. Is é an comhlacht é a bhfuil comhactaí dlíthiúla an stáit maidir le cur-chun-cinn tionscail agus forbairt teicneolaíochta dílsithe ann. Is é an comhlacht é freisin trína dciomnaítear cumhachtaí ar Fhiontraíocht Éireann le tionscail dúchais a chur chus cinn agus ar ghníomhaireacht Forbartha Tionscail na hÉireann (GFT Éireann) le hinfheistíocht isteach sa tír a chur chun tosaigh. Is iad feighmeanna Fhorfáis:

- ▶ comhairle a chur ar an Aire ó thaobh cúrsaí a bhaineann le forbairt tionscail sa Stát
- ▶ comhairle maidir le forbairt agus comhordú polasaithe a chur ar fáil d'Fhiontraíocht Éireann, d'GFT Éireann agus d'aon fhoras eile dá leithéid (a bunaíodh go reachtúil) a d'fhéadfadh an tAire a ainmniú trí ordú
- ▶ forbairt na tionsclaíochta, na teicneolaíochta, na margaíochta agus acmhainní daonna a spreagadh sa Stát
- ▶ bunú agus forbairt gnóthas tionsclaíoch ón iasacht a spreagadh sa Stát, agus
- ▶ Fiontraíocht Éireann agus GFT Éireann a chomhairliú agus a chomhordú ó thaobh a gcuid feidhmeanna.

Forfás is the national policy and advisory board for enterprise, trade, science, technology and innovation. It is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment. The broad functions of Forfás are to:

- ▶ advise the Minister on matters relating to the development of industry in the State
- ▶ to advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland and such other bodies (established by or under statute) as the Minister may by order designate
- ▶ encourage the development of industry, technology, marketing and human resources in the State
- ▶ encourage the establishment and development in the State of industrial undertakings from outside the State, and
- ▶ advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions.

Board Members

Peter Cassells	<i>Chairman</i>
Martin Cronin	<i>Chief Executive, Forfás</i>
Sean Dorgan	<i>Chief Executive, IDA Ireland</i>
Dan Flinter	<i>Chief Executive, Enterprise Ireland</i>
Paul Haran	<i>Secretary General, Department of Enterprise, Trade & Employment</i>
Professor Michael Hillery	<i>Chair of Manufacturing Engineering University of Limerick</i>
Rody Molloy	<i>Director General, FÁS</i>
William Murphy	<i>Partner, Tynan Dillon and Company</i>
Feargal O'Rourke	<i>Partner, Taxation Pricewaterhouse Coopers</i>
Professor Yvonne Scannell	<i>Professor at Law, Trinity College</i>
Toni Wall	<i>Managing Director, Wall-2-Wall Ltd</i>
Jane Williams	<i>Managing Director, The Sia Group Ltd</i>