ECONOMIC DEVELOPMENT & TRANSPORT COMMITTEE

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Venue: National Assembly for Wales, Cardiff Bay

Title: Review of Science Policy: updated background statistics

Purpose

This paper provides background statistics on science in Wales, to inform Members' discussion of the Review of Science Policy.

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1 Expenditure on R&D in Wales

1.1 R&D spend in business

Table 1 below shows the percentage of UK business R&D spend, and R&D employment, in Wales, 2001-03.

Table 1: Regional breakdown of R&D performed in UK businesses: expenditure and employment, 2001-03

	Expenditure £m			% of total	Employm	nent FTE (the	ousands)
Column	2001	2002	2003	2003	2001	2002	2003
UK England	12,336 11,538	13,110 12,138	13,687 12,786	100.0 93.4	152 139	167 151	163 149
Wales	136	182	264	1.9	3	3	4
Scotland	512	640	521	3.8	8	11	7
N. Ireland	150	149	116	0.8	3	3	3

Source: Office for National Statistics, BERD Survey, 2003

1.2 Government R&D spend in Wales

Statistics on Government R&D spend are published in the GERD¹ survey. This is not available on a regional basis.

2 Science Employment

Table 2 (over the page) shows the proportion of the Welsh working age population with a Science or Engineering HE qualification in 2003, and how this compares to the GB proportions.

¹ Gross Domestic Expenditure on R&D. The most recent survey is available at http://www.statistics.gov.uk/CCl/article.asp?ID=940&Pos=2&ColRank=2&Rank=224

Table 2: Proportion of working age population with Science or Engineering HE Qualification, Wales, 2003

				% of wor populati Scien Engineering	on with ce or
	All (000s)	With HE qual (000s)	Science or engineering HE qual (2) (000s)	Wales	GB
Wales					
Population of working age	1,741.8	257.8	98.9	6	6
of which					
Inactive	406.9	25.6	10.2	3	3
Economically active	1,334.9	232.2	88.7	7	7
Employed	1,267.6	229.2	86.1	7	7
Unemployed (4)	67.3	-	-	-	4
Unemployed as % of labour	5.0				

Source: Labour Force Survey, Office for National Statistics

Working age includes men aged 16 to 64 and women aged 16 to 59.

The UK Government employed **21,271 R&D personnel** in 2002-03 (the most recent year for which figures are available), of which 11,246 were employed by the Research Councils, 6,489 were employed by civil departments, and 3,536 were employed by the Ministry of Defence².

3 2001 Research Assessment Exercise

The Research Assessment Exercise (RAE) is carried out to enable higher education funding bodies to distribute research funding on the basis of the quality of the institution. The most recent RAE was conducted in 2001 and the next is planned for 2008.

Results of the RAE

The Higher Education Funding Council for Wales (HEFCW) has produced an analysis of the RAE³ which shows that:

♦ the number of Welsh Higher Education Institutions receiving the highest 5* rating⁴ in the 2001 RAE has quadrupled since the 1996 RAE.

⁽¹⁾ People who have obtained a Higher, First or Other degree or NVQ level 5

People who have obtained a HE qualification in a science or engineering subject

⁽³⁾ Nil returns have been included in the No HE Qualifications category

⁽⁴⁾ Unemployed as defined by the International Labour Organisation

² Office for Science and Technology, SET statistics: http://www.ost.gov.uk/setstats/8.htm

http://www.elwa.org.uk/./doc_bin/he%20circulars/w0213he%20(updated).pdf

⁴ The 5* rating is awarded to "quality that equates to attainable levels of international excellence in more than half of the research activity submitted and attainable levels of national excellence in the remainder".

◆ 75% of researchers in Welsh HEIs now work in 5*, 5 and 4 rated departments producing work of "international excellence" – this compares with 52% five years ago, and less than 30% nine years ago.

4 Economic Research Advisory Panel

The 2003 Annual Report on Government Funded Economic Research in Wales stated that a study on "Opportunities to strengthen innovation and diffusion in Wales" was planned for 2004-05. The specification for this work is still in preparation⁵.

5 Spin-off companies

5.1 Wales Spinout Programme

In 2004-05, overall expenditure on the Wales Spinout Programme from Finance Wales was £708,154 (for all twelve Welsh HEIs)⁶. Finance Wales has also invested £349,500 in Spinout Loans.

It is not possible to make direct comparisons with the amount spent on university spinouts in other UK regions, because in England, funding for spinouts is incorporated into each individual university's funding; England has no joined-up approach as provided under the Spinout Wales programme.

5.2 Higher Education-Business Interaction Survey

Information on spinout companies from HEIs is available in the Higher Education Business Interaction Survey 2001-02⁷.

Data by individual institution are not available as all survey information is collected on the understanding that it will not be used at any point to identify individual HEIs.

⁷ The Survey report can be seen at:

http://www.hefce.ac.uk/pubs/hefce/2005/05_07

⁵ June 2005 ERAP report http://www.wales.gov.uk/subiresearch/content/eru/erap-report-062005-e.pdf

⁶ As part of this, £16,913 was spent on promotional activities targeted at the HEIs.

5.3 HE Spin-off Activity

Tables 3-6 are based on information taken from the 4th Higher Education-Business Interaction Survey, 2004, and give information on spin-offs from HEIs in Wales.

Table 3: Spin-offs with some HEI ownership (2002-03)

	Number established	Number still active which have survived at least 3 years	Number of active firms	Estimated employment of active firms (FTE)	Estimated turnover of active firms (£000s)
North East	6	12	26	55	1,000
North West	27	57	101	848	33,931
Yorkshire / Humber	20	67	103	291	11,017
East Midlands	20	33	58	422	45,492
West Midlands	17	18	41	140	7,684
East of England	4	42	59	1,113	9,003
London	29	82	164	860	28,490
South East	19	50	71	333	24,725
South West	5	22	42	156	6,520
England	147	383	665	4,218	167,862
Northern Ireland	6	31	49	737	46,000
Scotland	17	73	97	1,045	20,677
Wales	7	19	38	150	7,550
UK total	177	506	849	6,150	242,089
Wales as % of UK	3.9	3.8	4.5	2.3	3.1

Table 4: Formal spin-offs from HEI Institutions, not HEI owned (2002-03)

	Number established	Number still active which have survived at least 3 years	Number of active firms	Estimated employment of active firms (FTE)	Estimated turnover of active firms (£000s)
North East	1	11	18	44	4,833
North West	1	0	1	0	0
Yorkshire / Humber	0	4	5	65	1,970
East Midlands	3	2	5	0	0
West Midlands	2	3	7	5,003	0
East of England	1	0	0	2	100
London	0	7	8	350	75,000
South East	1	9	10	405	150
South West	2	4	7	31	2,163
England	11	40	61	5,900	84,216
Northern Ireland	0	0	0	0	0
Scotland	2	10	18	540	18,440
Wales	7	10	17	195	13,630
UK total	20	60	96	6,635	116,286
Wales as % of UK total	35.0	16.6	17.7	2.9	11.7

Table 5: Staff start-ups from HEI Institutions, 2002-03

	Number established	Number still active which have survived at least 3 years	Number of active firms	Estimated employment of active firms (FTE)	Estimated turnover of active firms (£000s)
North East	1	7	9	6	200
North West	3	10	13	17	280
Yorkshire / Humber	5	5	7	25	170
East Midlands	0	0	0	0	0
West Midlands	7	9	13	25	13,260
East of England	8	0	2	1,507	30
London	4	7	16	110	11,411
South East	37	58	30	35	4,000
South West	1	11	17	25	1,650
England	66	107	107	1,750	31,001
Northern Ireland	0	4	4	25	1,500
Scotland	6	5	9	116	276
Wales	2	6	14	97	7,485
UK total	74	122	134	1,988	40,262
Wales as % of UK total	2.7	4.9	10.4	4.9	18.6

Table 6: Graduate start-ups from HEI institutions, 2002-03

	Number established	Number still active which have survived at least 3 years	Number of active firms	Estimated employment of active firms (FTE)	Estimated turnover of active firms (£000s)
North East	31	14	47	193	1,329
North West	26	35	68	304	11,225
Yorkshire / Humber	76	12	139	235	6,880
East Midlands	33	29	82	156	1,527
West Midlands	17	24	41	70	5,287
East of England	18	0	2	2	10
London	44	7	78	288	70,890
South East	138	155	99	35	1,750
South West	3	2	3	1	0
England	386	278	559	1,284	98,898
Northern Ireland	0	2	2	15	1,000
Scotland	27	16	52	143	930
Wales	76	27	119	165	4,815
UK total	489	323	732	1,607	105,643
Wales as % of UK total	15.5	8.4	16.3	10.3	4.6

6 Collaborative research

Tables 7-9 are based on the Higher Education-Business Interaction Survey and show data on collaborative research involving public funding and funding from business, 2002-03.

Table 7: Collaborative research in HEIs involving public funding and funding from business, UK, 2002-03

	OST Research Councils (£000s)	Other Government depts. (£000s)	EU Government (£000s)	Other (£000s)	Totals (£	2001-02
Area						
North East	15,742	12,695	7,154	4,337	39,928	38,771
North West	28,230	9,917	8,906	3,417	50,470	45,213
Yorkshire / Humber	7,312	12,215	3,478	4,899	27,904	22,702
East Midlands	18,640	7,276	9,034	4,317	39,267	38,545
West Midlands	4,302	4,747	2,137	1,934	13,120	25,967
East of England	15,153	16,622	9,190	17,357	58,322	40,065
London	33,703	12,969	21,371	2,765	70,808	55,789
South East	35,352	11,290	16,449	3,511	66,602	75,361
South West	3,627	2,691	2,486	1,497	10,301	12,829
England	162,061	90,422	80,205	44,034	376,722	355,242
Northern Ireland	6,928	12,471	2,991	5,321	27,711	23,765
Scotland	14,750	4,467	14,185	10,241	43,643	52,017
Wales	15,386	13,524	3,454	16,739	49,103	38,330
UK total	199,125	120,884	100,835	76,335	497,179	469,354
Wales as % of UK	7.7	11.2	3.4	21.9	9.8	8.2

Table 8: Research contracts in HEIs, by UK region, 2002-03

	Number with SMEs	Total value with SMEs (£000s)	Number with other (non- SME) commercial business	Total value with other (non-SME) commercial business (£000s)	Total number of contracts	Total value of contracts (£000s)
Area North East	48	1,108	292	10,133	340	11,241
North West	154	3,250	440	15,203	594	18,453
Yorkshire / Humber	246	5,446	934	31,198	1,180	36,644
East Midlands	1,055	3,496	901	15,396	1,956	18,892
West Midlands	206	1,936	529	7,534	735	9,470
East of England	172	3,952	701	29,622	873	33,574
London	164	7,454	1,315	48,803	1,479	56,257
South East	1,555	6,424	1,282	31,812	2,837	38,236
South West	134	2,494	675	12,643	809	15,137
England	3,734	35,560	7,069	202,344	10,803	237,904
Northern Ireland	62	935	62	2,032	124	2,967
Scotland	268	4,067	764	29,211	1,032	33,278
Wales	84	1,651	359	6,326	443	7,977
UK total	4,148	42,213	8,254	239,913	12,402	282,126
Wales as % of UK	2.1	3.9	4.3	2.6	3.6	2.8

Table 9: Consultancy contracts in HEIs, by UK region, 2002-03

Area	Number with SMEs	Total value with SMEs (£000s)	Number with other (non-SMEs) commercial businesses	Total value with other (non-SMEs) commercial businesses (£000s)	Number with non- commercial orgs (£000s)	Total number of contracts	Total income (£000s)
North East	872	4,360	362	3,162	715	1,949	8,527
		,		,		,	
North West	2,083	2,741	313	1,813	469	2,865	8,089
York / Humber	347	931	318	3,254	256	921	6,501
East Midlands	264	882	252	2,084	281	797	6,597
W'Midlands	1,350	1,748	322	2,655	694	2,366	16,281
East England	754	2,061	304	3,942	151	1,209	8,656
London	521	1,471	904	11,531	1,601	3,026	35,817
South East	160	2,860	250	5,218	787	1,197	16,757
South West	334	936	303	4,323	480	1,117	18,598
England	6,685	17,990	3,328	37,982	5,434	15,447	125,823
N'Ireland	229	943	25	102	127	381	1,516
Scotland	471	3,074	796	8,492	769	2,036	20,796
Wales	363	3,887	106	7,655	549	1,018	20,016
UK total	7,748	25,894	4,255	54,231	6,879	18,882	168,151
Wales as % of UK	4.7	15.0	2.5	14.1	7.9	5.4	11.9

7 Research grants and contracts by Welsh HEI

The table below shows the sources of research grants and contracts expenditure for each HEI institution in Wales, 2002-03.

Table 10: Research grants and contracts expenditure by Welsh HEI, 2002-03

								£000s
Institution	OST Research Councils	UK-based Charities	UK Gov. Bodies, Health and Hospital Authorities	UK Industry, Commerce Public Corps	EU sources	Other Overseas	Other Sources	Total
University of Glamorgan	304	644	4,611	445	307	32	367	6,710
University of Wales, Aberystwyth	3,718	638	2,375	710	985	161	243	8,830
University of Wales, Bangor	2,541	720	1,979	516	1,852	58	766	8,432
Cardiff University	8,754	6,645	7,672	3,725	1,993	850	6,900	36,539
University of Wales, Lampeter	21	92	154	11	0	0	0	278
University of Wales, Swansea	4,400	393	3,068	1,165	991	154	182	10,353
University of Wales College of Medicine	2,191	5,608	2,341	1,537	976	631	1,103	14,387
University of Wales Institute, Cardiff	0	20	738	0	0	5	0	763
University of Wales College, Newport	68	3	59	0	0	0	0	130
NE Wales Institute of Higher Education	(1)	27	70	48	52	88	0	284
Swansea Institute of Higher Education	0	5	0	13	0	0	0	18
Trinity College Carmarthen	0	0	0	0	0	0	0	0
Royal Welsh College of Music and Drama	0	0	0	0	0	0	0	0
Federal University of Wales – central functions	155	6	20	5	0	3	0	189
Total	22,151	14,801	23,087	8,175	7,156	1,982	9,561	86,913

Source: Higher Education, Further Education and Training Statistics in Wales, 2002-03

8 Higher Education Funding Council (HEFCW) funding for research

Welsh Universities and Colleges receive funding through the Science Research Investment Fund, a UK-wide scheme run jointly by the Office of Science and Technology (OST) and the UK Higher Education Institutions. Of the £46.7 million available for Wales over 2004-05 and 2005-06, £25.2 million came from the OST and £21.5 million from HEFCW. In the current round, the emphasis was on making investments that will ensure the financial sustainability of universities' and colleges' research facilities for the long term.

The Postgraduate Research Training Allocations are for postgraduate research students and are awarded to Departments meeting specific criteria in the Research Assessment Exercise.

Table 11 below shows HEFCW Research Investment Fund (RIF) and Postgraduate Research Training Allocations, 2005-06:

Table 11: HEFCW Research Investment Fund and Postgraduate Research Training Allocation, 2005-06

£

Institution	Research Investment Fund	Postgraduate Research Training Allocations
University of Glamorgan	691,014	423,611
University of Wales, Aberystwyth	1,039,832	375,657
University of Wales, Bangor	464,695	518,914
Cardiff University	49,696	2,728,292
University of Wales, Lampeter	117,077	86,565
University of Wales, Swansea	1,231,388	888,034
University of Wales Institute, Cardiff	252,575	55,373
University of Wales, Newport	93,260	29,432
North East Wales Institute of Higher Education	120,202	8,593
Swansea Institute of Higher Education	81,218	6,898
Total	4,140,959	5,121,369

Source: Higher Education Funding Council for Wales

9 Research Councils

There are two Research Councils which have a direct impact on research funding in Wales: the Economic and Social Research Council (ESRC) and the Natural Environment Research Council (NERC).

9.1 Economic and Social Research Council (ESRC)

The ESRC funds research and training in social and economic issues, through researchers in academic institutions, policy research institutes and postgraduate students.

Table 12 (over the page) shows spend by the ESRC in UK regions, 2003-04.

Table 12: ESRC spend, by UK region, 2003-04

£000s

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	Research	Training	Overall
England	58,551	21,308	79,859
Scotland	3,687	1,964	5,561
Wales	2,817	1,372	4,189
Ireland	411	2	413
Other	2,016	974	2,990
Total	67,482	25,620	93,102

Source: Economic and Social Research Council

9.2 Natural Environment Research Council (NERC)

The work of the Natural Environment Research Council focuses broadly on training in the environmental sciences. NERC has one Research Centre in Wales, the Centre for Ecology and Hydrology in Bangor⁸. It also has one Collaborative Centre, the Climate and Land Surface Systems Interaction Centre in the University of Wales, Swansea⁹.

NERC offers a range of funding schemes: the largest of these is the *Blue Skies Research Grant*, which is intended to support "…excellent, curiosity-driven environmental science, free from boundaries"¹⁰. NERC intends that blue skies funding should support the 'best science'.

Table 13 below shows all NERC research grants (Blue Skies plus other grant and funding of fellowships etc) awarded to Welsh HEIs, 2004-05:

Table 13: NERC research grants in Wales, 2004-05

	£000S
Cardiff University University of Wales, Aberystwyth University of Wales, Swansea	457 244 26
Total Welsh HEIs	727
% of UK total	1.8

Source: Natural Environment Research Council

⁸ http://www.nerc.ac.uk/aboutus/researchcentres/sites-ceh-bangor.shtml

⁹ http://classic.nerc.ac.uk

¹⁰ NERC Research Grants Handbook http://www.nerc.ac.uk/funding/forms/index.shtml#grantsbooklet

10 EU structural funds

Objective 1, Priority 2, Measure 3 provides support for the development of innovation and R&D in Wales.

Table 14 below shows grant available, committed and spent from this Measure at the end of April 2005.

Table 14: Grant available, committed and spent, Priority 2 Measure 3, at end April 2005

101.8
86.4
84.1
86.7
85
44

Source: Welsh European Funding Office

At 30 April 2005, the Measure had produced the following outputs:

- ◆ Companies receiving advice on innovation/R&D: 8,153 (100+% of the target)¹¹;
- Gross new jobs: 1,061 (21% of the target);
- Gross new indirect jobs: 841;
- Gross new jobs in hi-tech sectors: 518 (17% of the target);
- ◆ Gross new safeguarded jobs: 9,073 (100+% of the target);
- ◆ Gross new companies in hi-tech sectors: **113** (6% of the target).

11 Wellcome Trust funding in Wales

The Wellcome Trust offers funding in the areas of biomedical science, technology transfer, medical humanities and public engagement¹².

In 2004, Cardiff University and the University of Wales College of Medicine were awarded total funding of £3.9m for 17 research contracts¹³; this was **1.7%** of the total funding provided by the Wellcome Trust to universities in the UK and abroad.

In 2003, these universities received £7.2m for 21 research contracts (2.3% of the total Wellcome Trust funding).

12 Marie Curie fellowships

Marie Curie fellowships¹⁴ are European Commission-funded grants aimed at stimulating the training and mobility of researchers across the EU.

¹¹ Targets were set out in the Objective 1 Programme Complement

¹² Wellcome Trust grants http://www.wellcome.ac.uk/funding

¹³ Wellcome Trust annual report http://www.wellcome.ac.uk/assets/wtd015233.pdf

At March 2005, 479 Marie Curie fellowships had been awarded in the UK, broken down as follows¹⁵:

England	411
Scotland	52
Wales	11
Northern Ireland	5
UK	479
Wales as % of UK	2.3

Tax credits for Research and Development 13

R&D tax credits were introduced to encourage greater R&D spending in order to promote investment in innovation. The system works by allowing companies to deduct up to 150% of qualifying expenditure on R&D activities when calculating their profit for tax purposes. SMEs can sometimes surrender this tax relief to claim payable tax credits in cash from Her Majesty's Revenue and Customs.

Statistics on companies that have received/are receiving R&D tax credits are currently only available on a UK basis. Her Majesty's Revenue and Customs are hoping to produce statistics on a regional basis in 2006.

Marie Curie actions http://www.cordis.lu/mariecurie-actions
 Data supplied by the European Commission, March 2005