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SCOTLAND

BUSINESS ENTERPRISE RESEARCH AND DEVELOPMENT SCOTLAND 2007



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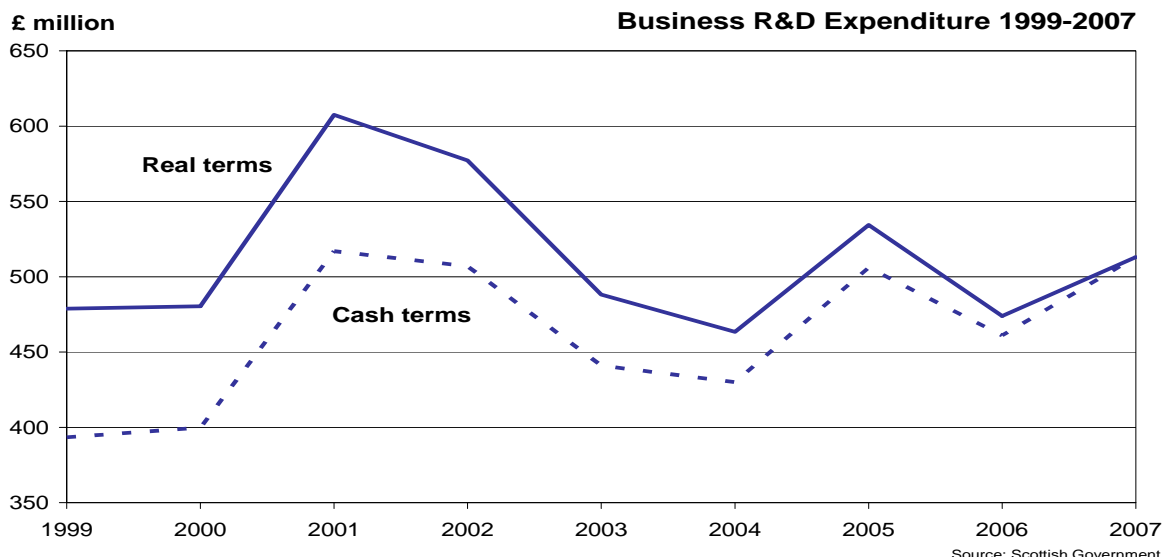
This publication presents information on research and development (R&D) performed by businesses operating in Scotland in 2007 as well as revisions to previously published data, for more information on the revisions see Background Note 1. In addition, figures are presented for total R&D expenditure in Scotland for 2007, which includes government and higher education expenditure. The majority of the data presented in this release come from R&D surveys conducted by the Office for National Statistics (ONS). Further information on Scottish R&D activity and the full set of tables are available at:

www.scotland.gov.uk/Topics/Statistics/Browse/Business/BERD

BUSINESS ENTERPRISE RESEARCH AND DEVELOPMENT (BERD)

Expenditure and employment

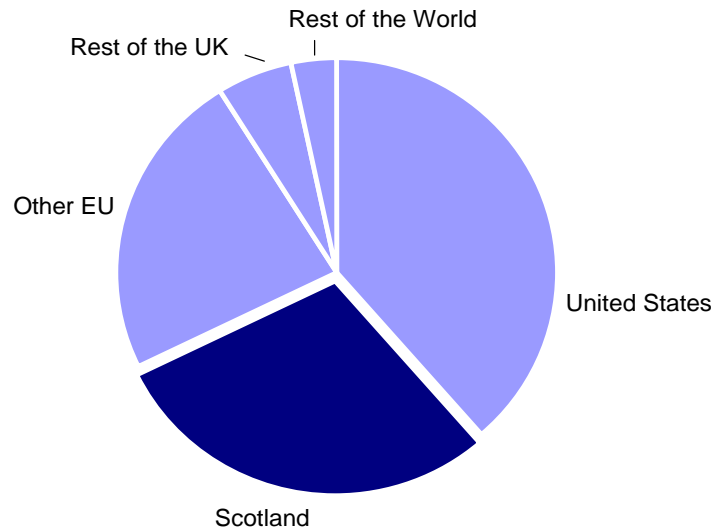
The value of business enterprise research and development (BERD) undertaken in Scotland in 2007 was £513 million, 3.2% of the UK total and 0.46% of Scottish GDP. Expenditure increased from £461 million in the previous year (a 8.3% increase in real terms). There was a decrease in expenditure on services R&D, while there was a modest increase in expenditure on manufacturing R&D and a proportionally higher increase in expenditure on R&D in other sectors such as extractive industries. Almost half of Scottish BERD supported just 2 product groups: 'pharmaceuticals' (25%) and 'precision instruments' (23%) (Table 2). Scottish business R&D provided employment for 6,707 people in 2007 (Table 3).



R&D funding and size & ownership of R&D performing businesses

Nearly two thirds (62%) of R&D undertaken by businesses in Scotland was funded by businesses operating in the UK, 11% was funded by the Government and 27% came from overseas (Table 7). In terms of business size, the largest companies (400 employees and over) accounted for 66% of BERD expenditure, while companies employing 100 to 399 employees accounted for a further 16% (Table 8). USA owned firms undertook 39% of business R&D expenditure in Scotland, followed by Scottish based firms (29%) (Table 9).

Business R&D expenditure by country of ownership 2007



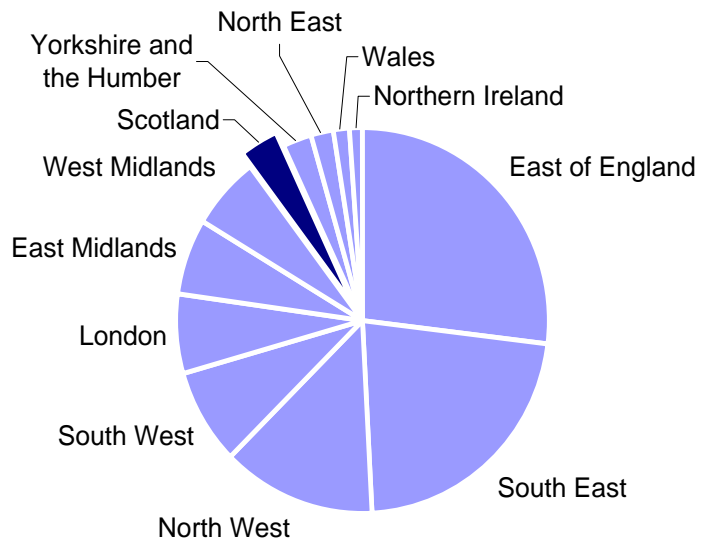
Source: Scottish Government

International and regional comparisons

In 2007 BERD expenditure was equivalent to 0.46% of GDP in Scotland compared to 1.13% of GDP in the UK. BERD expenditure as a percentage of GDP is lower in Scotland than in most important competitor countries. In 2007 the average EU expenditure on business R&D as a percentage of GDP was 1.12%. The leading countries have expenditure levels more than five times higher than Scotland (e.g. 2.66% of GDP in Sweden) (Table 6A).

Within the UK, the bulk of business R&D expenditure takes place within the East of England (27%) and the South East (22%) regions of England. In terms of expenditure as a percentage of GDP, Scotland ranked eighth out of the 12 UK regions in 2007 (Table 5A).

Business R&D expenditure by UK region 2007



Source: Scottish Government

GROSS EXPENDITURE ON RESEARCH AND DEVELOPMENT (GERD)

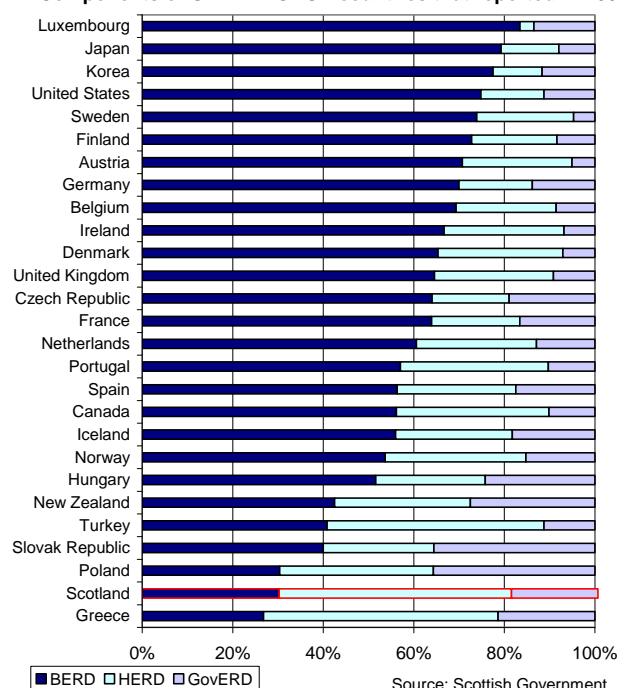
Expenditure and components of GERD

Gross expenditure on R&D (GERD) comprises that undertaken by business, government and the higher education sectors. In 2007 Scottish GERD reached £1,710 million, 6.7% of the UK total. This is an increase of £189 million since 2006. GERD represented 1.52% of GDP in Scotland, compared to 1.79% in the UK. Scotland performs better on this measure of R&D due to the inclusion of higher education and government activity (see below). However, the relatively low contribution of business R&D to GERD is clear when comparing Scotland to other countries.

In comparison to other regions within the UK, Scotland ranks sixth in terms of GERD as a percentage of GDP in 2007 (Table 4A).

Scottish GERD forms the basis of the National Indicator: At least halve the gap in total research and development spending compared with EU average by 2011. The gap between Scotland and the EU average, in terms of GERD as a percentage of GDP, decreased by 0.08 percentage points from 0.33 percentage points in 2006 to 0.25 percentage points in 2007 (Table 4B).

Components of GERD in OECD countries that reported in 2007



Source: Scottish Government

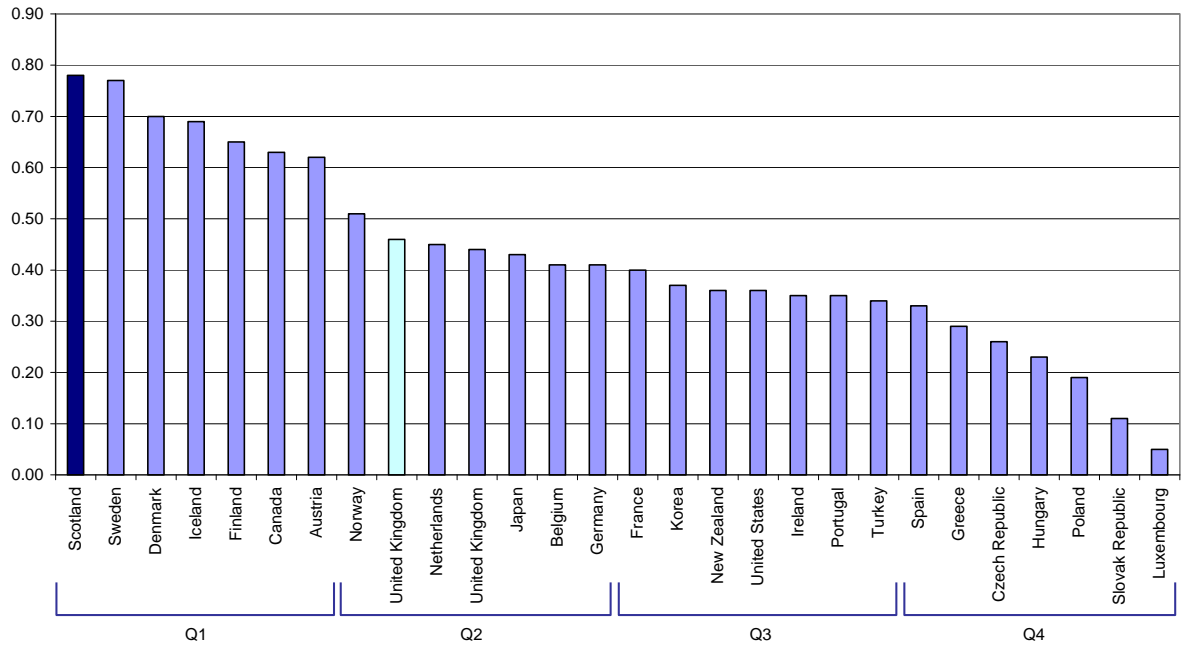
Higher Education Research and Development (HERD)

Scotland performs very well in terms of R&D undertaken by the higher education sector. In 2007, Higher Education R&D (HERD) was £870 million in Scotland, 13.4% of the UK total and 0.78% of GDP. This is an increase of £98 million since 2006. In comparison to other regions within the UK, Scotland ranks first in terms of HERD as a percentage of GDP (Table 5B). Scotland also performs well at the international level, with Scotland's HERD as a percentage of GDP highest among the OECD countries (Table 6B).

Government Research and Development (GovERD)

Government expenditure on R&D stood at £327 million in 2007, 14.6% of the UK figure and 0.29% of GDP. This is an increase of £39 million since 2006. In comparison to other regions within the UK, Scotland ranks third in terms of government R&D expenditure as a percentage of GDP (Table 5C).

HERD as a % of GDP in OECD countries that reported in 2007



Source: Scottish Government

TABLE 1A
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
BROAD PRODUCT GROUPS, 1997 to 2007
CURRENT PRICES

	£ thousands										
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Manufacturing: Total	214 076	254 829	315 498	359 350	453 440	426 576	367 555	359 558	415 191	380 637	419 135
Chemicals	36 397	61 429	134 984	131 767	180 469	177 405	160 126	153 483	173 096	136 059	142 055
Mechanical Engineering	45 270	53 641	55 623	55 989	51 819	63 272	48 285	53 665	23 264	21 491	22 459
Electrical Machinery	103 521	115 040	96 062	136 156	57 695	64 960	48 230	56 770	98 006	92 531	106 577
Transport Equipment & Aerospace	2 409	4 455	3 342	3 543	3 779	4 916	6 245	6 998	6 528	5 031	9 270
Other manufactured Products	26 480	20 264	25 488	31 896	159 678	116 023	104 670	88 642	114 298	125 525	138 774
Services	69 891	90 961	65 157	33 679	50 016	60 757	56 272	56 017	71 053	58 801	52 540
Other Total	6 869	11 724	12 753	6 829	13 213	19 377	17 438	14 804	20 215	21 747	41 446
Agriculture, hunting & forestry; Fishing	..	..	..	..	..	60 757	56 272	..	..	1 439	..
Extractive industries	2 879	6 389	8 688	4 540	11 270	..	..	12 225	18 227	19 136	30 720
Electricity, gas & water supply	1 023	..	..	657	..	17 701	14 701	..	..	..	..
Construction	..	..	..	..	..	..	..	1 556	1 085	..	1 326
GRAND TOTAL	290 835	357 514	393 408	399 858	516 669	506 710	441 265	430 379	506 459	461 185	513 121

Source: Office for National Statistics

1 .. denotes disclosive value

TABLE 1B
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
BROAD PRODUCT GROUPS, 1997 to 2007
IN REAL TERMS (2007 PRICES)

	£ thousands										
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Manufacturing: Total	271 333	316 259	384 004	431 714	532 876	485 651	406 857	387 467	438 442	391 240	419 135
Chemicals	46 132	76 237	164 294	158 301	212 084	201 973	177 248	165 397	182 789	139 849	142 055
Mechanical Engineering	57 378	66 572	67 701	67 264	60 897	72 034	53 448	57 831	24 567	22 090	22 459
Electrical Machinery	131 209	142 772	116 921	163 574	67 802	73 956	53 387	61 177	103 494	95 108	106 577
Transport Equipment & Aerospace	3 053	5 529	4 068	4 256	4 441	5 597	6 913	7 541	6 894	5 171	9 270
Other manufactured Products	33 562	25 149	31 022	38 319	187 651	132 090	115 862	95 522	120 699	129 021	138 774
Services	88 584	112 888	79 305	40 461	58 778	69 171	62 289	60 365	75 032	60 439	52 540
Other Total	8 706	14 550	15 522	8 204	15 528	22 060	19 303	15 953	21 347	22 353	41 446
Agriculture, hunting & forestry; Fishing	..	..	..	..	..	69 171	62 289	..	..	1 479	..
Extractive industries	3 649	7 929	10 574	5 454	13 244	..	..	13 174	19 248	19 669	30 720
Electricity, gas & water supply	1 297	..	..	789	..	20 152	16 273	..	..	..	..
Construction	..	..	..	..	..	..	..	1 677	1 146	..	1 326
GRAND TOTAL	368 622	443 698	478 832	480 379	607 182	576 882	488 449	463 785	534 821	474 031	513 121

Source: Office for National Statistics

- 1 .. denotes disclosive value
2. HM Treasury GDP deflators are used to convert the data to 2007 prices.

TABLE 2
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
DETAILED PRODUCT GROUPS, 1997 to 2007

	£ thousands											
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	% of 2007 Total
Agriculture, hunting and forestry: Fishing	..	..	..	..	..	547	..	978	871	1 439	..	..
Extractive Industries	2 879	6 389	8 688	4 540	11 270	17 701	14 701	12 225	18 227	19 136	30 720	6.0%
Food Products and beverages: Tobacco products	3 167	2 268	1 871	2 937	2 367	6 147	3 120	3 762	5 176	7 490	7 848	1.5%
Textiles, clothing and leather products	1 934	2 594	2 150	2 022	1 461	1 357	1 754	5 661	946	1 217	2 660	0.5%
Pulp, paper and paper products; Printing and publishing: Wood and straw products	1 275	933	848	541	..	775	1 855	2 075	1 520	1 157	2 761	0.5%
Refined petroleum products and coke oven products: Processing of nuclear fuel	..	..	..	..	..	..	..	..	..	..	..	..
Chemicals. Man-made fibres	14 481	21 107	21 810	16 110	27 315	18 996	16 065	16 742	13 942	11 208	13 191	2.6%
Pharmaceuticals, medical chemicals and botanical products	21 916	40 322	113 174	115 657	153 154	158 409	144 062	136 741	159 154	124 851	128 865	25.1%
Rubber and plastic products	..	..	1 381	2 396	1 141	2 304	4 551	1 584	2 989	3 183	2 637	0.5%
Other non-metallic mineral products	..	..	..	372	..	..	..	920	1 107	648	661	0.1%
Casting of iron and steel	-	..	..	..	..	594	..	..	..	..	..	..
Non-ferrous metals	..	..	..	..	..	..	..	..	..	..	..	..
Fabricated metal products	6 197	8 288	8 494	5 666	5 381	8 619	5 372	3 976	3 740	3 522	5 725	1.1%
Machinery and equipment	39 072	45 354	47 129	50 323	46 438	54 653	42 913	49 689	19 523	17 969	16 733	3.3%
Office machinery and computers	..	..	10 523	5 465	3 497	4 016	1 409	1 047	..	..	..	..
Electrical machinery and apparatus	..	..	70 370	115 281	20 142	15 682	6 662	14 627	16 613	18 582	32 356	6.3%
Radio, television and communication equipment	11 817	10 656	15 168	15 411	34 056	45 262	40 158	41 096	48 056	43 440	44 715	8.7%
Precision instruments	17 037	10 466	16 289	22 419	150 745	103 408	90 645	73 580	99 677	110 680	118 438	23.1%
Motor vehicles and parts	1 408	3 372	2 385	1 930	2 474	2 222	4 498	1 998	3 828	2 944	5 379	1.0%
Other transport equipment	..	..	..	..	..	..	..	1 270	904	..	..	..
Shipbuilding and repairs	..	..	..	..	..	..	..	..	..	..	1 596	0.3%
Aerospace	..	..	..	..	..	..	..	..	..	..	..	..
Furniture: Other manufactured goods	..	..	1 799	800	1 536	883	1 219	834	2 451	864	1 042	0.2%
Recycling	..	..	..	..	..	..	..	..	..	34	..	..
Electricity, gas and water supply	1 023	..	..	657	..	..	..	..	..	..	..	..
Construction	..	..	..	..	..	..	1 054	1 556	1 085	1 161	1 326	0.3%
Wholesale and retail trade	..	..	..	..	1 500	3 138	1 422	2 380	2 567	4 085	1 116	0.2%
Transport and storage	-	-	-	..	..	..	..	89	291	63	13	0.0%
Post and telecommunications	..	..	..	..	..	..	..	..	10 454	..	..	..
Miscellaneous business activities: Technical testing and analysis	5 310	3 544	4 539	8 101	9 963	13 822	9 697	10 974	18 762	12 773	18 194	3.5%
Computer and related activities	55 048	57 705	40 961	9 797	16 283	18 281	21 301	25 587	27 574	24 911	24 406	4.8%
Research and development services	..	29 658	19 551	13 130	15 324	18 672	17 543	9 899	9 411	5 189	2 143	0.4%
Public administration	..	..	..	..	..	1 531	1 016	2 182	1 993	3 350	2 293	0.4%
GRAND TOTAL	290 835	357 514	393 408	399 858	516 669	506 710	441 265	430 379	506 459	461 185	513 121	100.0%

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display

2 .. denotes disclosive value

TABLE 3
EMPLOYMENT ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
1997 to 2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Full time equivalent	
										2006	2007
Scientist and engineers	3 866	4 574	3 922	3 435	4 152	4 177	3 725	3 528	3 629	3 500	3 779
Technicians, laboratory assistants and draughtsmen	956	1 005	1 069	1 117	1 294	1 373	1 075	1 202	1 288	1 297	1 506
Administrative, clerical industrial and other staff	860	779	1 712	1 480	1 764	1 780	1 652	1 682	1 621	1 527	1 423
GRAND TOTAL	5 682	6 359	6 703	6 032	7 210	7 269	6 452	6 412	6 537	6 324	6 707

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Percentages	
										2006	2007
Scientist and engineers	68	72	59	57	58	57	58	55	56	55	56
Technicians, laboratory assistants and draughtsmen	17	16	16	19	18	19	17	19	20	21	22
Administrative, clerical industrial and other staff	15	12	26	25	24	24	26	26	25	24	21
TOTAL	100	100	100	100	100	100	100	100	100	100	100

Source: Office for National Statistics

TABLE 4A
GROSS EXPENDITURE ON R&D (GERD) BY GOVERNMENT OFFICE REGION, 2007

	GERD (£ millions)	Percentage of UK GERD	GERD per head of population £	GERD as a percentage of GDP
East of England	5 296	20.8	936	4.36
South East	5 125	20.2	617	2.55
North West	2 802	11.0	408	2.06
London	2 951	11.6	390	1.03
South West	1 858	7.3	359	1.73
Scotland	1 710	6.7	332	1.52
East Midlands	1 450	5.7	330	1.64
West Midlands	1 320	5.2	245	1.26
North East	533	2.1	208	1.16
Northern Ireland	335	1.3	190	1.03
Yorkshire and the Humber	959	3.8	185	0.96
Wales	525	2.1	176	1.04
UK	25 423	100.0	417	1.79

Source: Office for National Statistics and Scottish Government

1. Private non-profit included in UK total only.
2. The percentage of UK GERD for the Government Office Regions does not sum to 100 due to the inclusion of private non-profit in the UK total.
3. Ranked by GERD per head of population.

TABLE 4B
R&D PERFORMED WITHIN SCOTLAND:
EXPENDITURE & AS A PERCENTAGE OF GDP, 1999 to 2007

	£ millions									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	
BERD	393	400	517	507	441	430	506	461	513	
HERD	411	440	525	608	618	641	688	772	870	
GovERD	200	238	226	237	277	286	307	288	327	
GERD	1 004	1 078	1 268	1 352	1 336	1 357	1 501	1 521	1 710	

	Percentage of GDP¹									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	
BERD	0.52	0.51	0.64	0.59	0.48	0.45	0.51	0.43	0.46	
HERD	0.54	0.56	0.65	0.71	0.68	0.67	0.69	0.72	0.78	
GovERD	0.26	0.30	0.28	0.28	0.30	0.30	0.31	0.27	0.29	
GERD	1.32	1.38	1.57	1.58	1.47	1.42	1.50	1.43	1.52	
EU 27 GERD	1.72	1.74	1.75	1.76	1.75	1.73	1.73	1.76	1.77	
Gap in GERD Percentage of GDP between Scotland and EU 27	0.40	0.36	0.18	0.18	0.28	0.31	0.23	0.33	0.25	

Source: OECD MSTI 2009/1, ONS and Scottish Government

1. Market price GDP estimated for Scotland based on the UK GVA to GDP ratio.
2. Scottish GERD excludes the private non-profit sector.
3. The EU expanded from 25 to 27 nations in 2007. These figures are for the 27 nations.

TABLE 5A
R&D PERFORMED IN UK BUSINESSES BY GOVERNMENT OFFICE REGION:
EXPENDITURE & AS A PERCENTAGE OF GDP, 1999 to 2007

	Business R&D Expenditure (£million)									% of total 2007	% of GDP ¹								
	1999	2000	2001	2002	2003	2004	2005	2006	2007		1999	2000	2001	2002	2003	2004	2005	2006	2007
East of England	2 559	2 758	2 798	2 650	2 915	2 672	3 718	3 948	4 350	27.0	3.23	3.34	3.24	2.89	2.98	2.59	3.44	3.45	3.58
South East	2 916	2 964	3 212	3 156	3 266	3 125	3 125	3 369	3 582	22.2	2.17	2.10	2.17	2.01	1.97	1.80	1.74	1.78	1.78
North West	1 476	1 451	1 582	1 604	1 538	1 739	1 892	1 623	2 150	13.3	1.56	1.49	1.56	1.50	1.37	1.48	1.55	1.26	1.58
East Midlands	838	933	909	974	862	936	1 006	985	1 053	6.5	1.42	1.53	1.42	1.43	1.19	1.22	1.27	1.17	1.19
South West	887	867	1 006	1 158	1 221	1 296	1 201	1 232	1 262	7.8	1.25	1.17	1.29	1.40	1.38	1.40	1.25	1.21	1.18
West Midlands	724	576	760	774	794	758	721	931	975	6.1	0.96	0.74	0.94	0.91	0.89	0.82	0.76	0.93	0.93
North East	164	164	125	124	149	257	289	292	310	1.9	0.52	0.51	0.37	0.35	0.39	0.65	0.70	0.67	0.68
Northern Ireland	99	139	150	149	116	120	148	157	177	1.1	0.47	0.63	0.65	0.61	0.45	0.44	0.52	0.51	0.55
Scotland	393	400	517	507	441	430	506	461	513	3.2	0.52	0.51	0.64	0.59	0.48	0.45	0.51	0.43	0.46
Wales	203	144	161	187	200	226	232	216	227	1.4	0.57	0.39	0.42	0.46	0.47	0.51	0.50	0.45	0.45
Yorkshire and the Humber	309	304	319	337	335	343	344	384	417	2.6	0.45	0.43	0.43	0.43	0.40	0.40	0.38	0.41	0.42
London	735	810	700	865	669	759	552	962	1 093	6.8	0.40	0.43	0.35	0.41	0.29	0.32	0.22	0.36	0.38
UK	11 302	11 510	12 239	12 484	12 505	12 662	13 734	14 561	16 111	100.0	1.20	1.16	1.19	1.14	1.08	1.04	1.08	1.08	1.13

Source: Office for National Statistics and Scottish Government

1. Market price GDP estimated for the regions based on the UK GVA to GDP ratio.
2. Ranked by percentage of GDP 2007

TABLE 5B
R&D PERFORMED IN HIGHER EDUCATION INSTITUTIONS BY GOVERNMENT OFFICE REGION:
EXPENDITURE & AS A PERCENTAGE OF GDP, 1999 to 2007

	Higher Education R&D Expenditure (£million)									% of total 2007	% of GDP ¹								
	1999	2000	2001	2002	2003	2004	2005	2006	2007		1999	2000	2001	2002	2003	2004	2005	2006	2007
Scotland	411	440	525	608	618	641	688	772	870	13.3	0.54	0.56	0.65	0.71	0.68	0.67	0.69	0.72	0.78
London	837	895	1 007	1 108	1 148	1 188	1 353	1 458	1 559	23.9	0.46	0.47	0.51	0.52	0.50	0.50	0.54	0.54	0.55
Wales	129	139	159	188	188	198	221	235	254	3.9	0.36	0.38	0.42	0.47	0.44	0.45	0.48	0.49	0.50
Yorkshire and the Humber	270	284	326	356	373	388	418	457	493	7.6	0.39	0.40	0.44	0.45	0.45	0.45	0.46	0.48	0.50
North East	113	122	146	166	170	176	189	206	222	3.4	0.36	0.38	0.43	0.47	0.45	0.44	0.46	0.47	0.48
East of England	255	324	376	421	442	464	505	520	580	8.9	0.32	0.39	0.44	0.46	0.45	0.45	0.47	0.45	0.48
South East	493	515	578	636	659	678	770	836	912	14.0	0.37	0.37	0.39	0.41	0.40	0.39	0.43	0.44	0.45
Northern Ireland	64	70	75	88	107	124	134	139	139	2.1	0.30	0.32	0.33	0.36	0.42	0.45	0.47	0.45	0.43
North West	260	287	331	370	390	416	474	531	560	8.6	0.28	0.29	0.33	0.35	0.35	0.35	0.39	0.41	0.41
East Midlands	182	204	230	246	239	244	270	289	307	4.7	0.31	0.33	0.36	0.36	0.33	0.32	0.34	0.34	0.35
West Midlands	180	192	213	231	245	269	292	303	322	4.9	0.24	0.25	0.26	0.27	0.27	0.29	0.31	0.30	0.31
South West	148	160	183	200	206	218	254	278	300	4.6	0.21	0.22	0.23	0.24	0.23	0.24	0.26	0.27	0.28
UK	3 324	3 691	4 149	4 618	4 785	5 004	5 580	6 023	6 517	100	0.35	0.37	0.40	0.42	0.41	0.41	0.44	0.45	0.46

Source: Office for National Statistics and Scottish Government

1. Market price GDP estimated for the regions based on the UK GVA to GDP ratio.
2. Ranked by percentage of GDP 2007

TABLE 5C
R&D PERFORMED IN GOVERNMENT, BY GOVERNMENT OFFICE REGION:
EXPENDITURE & AS A PERCENTAGE OF GDP, 1999 to 2007

	Government R&D Expenditure ¹ (£million)										% of total 2007	% of GDP ²								
	1999	2000	2001	2002	2003	2004	2005	2006	2007	1999		2000	2001	2002	2003	2004	2005	2006	2007	
South East	557	635	515	459	518	543	559	620	631	28.2	0.42	0.45	0.35	0.29	0.31	0.31	0.33	0.31		
East of England	213	259	277	285	345	378	381	367	366	16.4	0.27	0.31	0.32	0.31	0.35	0.37	0.35	0.30		
Scotland	200	238	226	237	277	286	307	288	327	14.6	0.26	0.30	0.28	0.28	0.30	0.30	0.31	0.27	0.29	
South West	259	307	254	228	296	329	362	391	296	13.2	0.36	0.41	0.33	0.28	0.34	0.36	0.38	0.28		
London	198	258	238	238	293	299	329	319	299	13.4	0.11	0.14	0.12	0.11	0.13	0.12	0.13	0.10		
East Midlands	48	56	68	65	79	80	88	84	90	4.0	0.08	0.09	0.11	0.10	0.11	0.10	0.11	0.10		
Wales	47	65	49	41	57	51	56	42	44	2.0	0.13	0.18	0.13	0.10	0.13	0.12	0.12	0.09		
North West	48	57	66	67	75	84	85	86	92	4.1	0.05	0.06	0.07	0.06	0.07	0.07	0.07	0.07		
Northern Ireland	12	15	16	15	17	21	20	21	19	0.8	0.06	0.07	0.07	0.06	0.07	0.08	0.07	0.06		
Yorkshire and the Humber	40	48	50	62	50	50	50	59	49	2.2	0.06	0.07	0.07	0.08	0.06	0.06	0.06	0.05		
West Midlands	164	194	65	50	58	46	48	34	23	1.0	0.22	0.25	0.08	0.06	0.06	0.05	0.05	0.02		
North East	2	2	4	6	2	2	2	3	1	0.0	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.01		
UK	2 086	2 240	1 834	1 766	2 068	2 170	2 289	2 313	2 238	100.0	0.22	0.23	0.18	0.16	0.18	0.18	0.18	0.17	0.16	

Source: Office for National Statistics and Scottish Government

1. Includes R&D performed in Research Councils.
2. Market price GDP estimated for the regions based on the UK GVA to GDP ratio.
3. Ranked by percentage of GDP 2007

TABLE 6A
EXPENDITURE ON R&D PERFORMED IN BUSINESSES IN SELECTED OECD COUNTRIES:
AS A PERCENTAGE OF GDP, 1999 to 2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percentage 1999-2007 Change
Scotland	0.52	0.51	0.64	0.59	0.48	0.45	0.51	0.43	0.46	-0.06
UK	1.20	1.16	1.19	1.14	1.08	1.04	1.08	1.08	1.13	-0.07
Germany	1.67	1.73	1.72	1.72	1.76	1.74	1.72	1.77	1.77	0.10
France	1.36	1.34	1.39	1.41	1.36	1.36	1.30	1.32	1.31	-0.05
Italy	0.50	0.52	0.53	0.54	0.52	0.52	0.55	0.55	0.55	0.05
Japan	2.14	2.16	2.30	2.36	2.40	2.38	2.54	2.63	2.68	0.54
Canada	1.06	1.15	1.29	1.17	1.16	1.19	1.15	1.11	1.05	-0.01
USA	1.98	2.05	2.00	1.86	1.84	1.79	1.83	1.89	1.93	-0.05
Denmark	1.41	..	1.64	1.73	1.78	1.69	1.68	1.66	1.66	0.25
Iceland	1.07	1.50	1.74	1.69	1.46	..	1.43	1.59	1.50	0.43
Ireland	0.87	0.80	0.77	0.76	0.79	0.81	0.82	0.88	0.88	0.01
Norway	0.92	..	0.95	0.95	0.98	0.87	0.82	0.82	0.88	-0.04
Finland	2.16	2.37	2.35	2.35	2.42	2.42	2.47	2.46	2.51	0.35
Sweden	2.68	..	3.23	..	2.86	2.67	2.62	2.79	2.66	-0.02
EU 27	1.09	1.11	1.12	1.11	1.10	1.09	1.08	1.11	1.12	0.03
OECD	1.50	1.53	1.55	1.50	1.50	1.48	1.51	1.56	1.59	0.09

Source: OECD MSTI 2009/1, ONS and Scottish Government

1 .. Data not available

2 The EU expanded from 25 to 27 nations in 2007. These figures are for the 27 nations.

TABLE 6B
EXPENDITURE ON R&D PERFORMED IN HIGHER EDUCATION IN SELECTED OECD COUNTRIES:
AS A PERCENTAGE OF GDP, 1999 to 2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percentage 1999-2007 Change
Scotland	0.54	0.56	0.65	0.71	0.68	0.67	0.69	0.72	0.78	0.24
UK	0.35	0.37	0.40	0.42	0.41	0.41	0.44	0.45	0.46	0.11
Germany	0.39	0.39	0.40	0.42	0.43	0.41	0.41	0.41	0.41	0.02
France	0.37	0.40	0.42	0.42	0.42	0.40	0.40	0.40	0.40	0.03
Italy	0.32	0.32	0.35	0.37	0.37	0.36	0.33	0.34	..	..
Japan	0.45	0.44	0.45	0.44	0.44	0.43	0.45	0.43	0.43	-0.02
Canada	0.52	0.54	0.58	0.65	0.67	0.70	0.69	0.66	0.63	0.11
USA	0.31	0.31	0.33	0.36	0.37	0.37	0.37	0.36	0.36	0.05
Denmark	0.42	0.45	0.45	0.58	0.60	0.61	0.60	0.64	0.70	0.28
Iceland	0.48	0.43	0.55	0.47	0.60	..	0.61	0.71	0.69	0.21
Ireland	0.24	0.23	0.24	0.25	0.29	0.33	0.34	0.34	0.35	0.11
Norway	0.47	..	0.41	0.44	0.47	0.47	0.47	0.46	0.51	0.04
Finland	0.62	0.60	0.60	0.64	0.66	0.68	0.66	0.65	0.65	0.03
Sweden	0.80	..	0.82	..	0.84	0.83	0.79	0.77	0.77	-0.03
EU 27	0.36	0.36	0.38	0.39	0.39	0.38	0.39	0.39	0.39	0.03
OECD	0.35	0.35	0.37	0.39	0.39	0.39	0.39	0.39	0.38	0.03

Source: OECD MSTI 2009/1, ONS and Scottish Government

1 .. Data not available

2 The EU expanded from 25 to 27 nations in 2007. These figures are for the 27 nations.

TABLE 6C
EXPENDITURE ON R&D PERFORMED IN GOVERNMENT IN SELECTED OECD COUNTRIES:
AS A PERCENTAGE OF GDP, 1999 to 2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percentage 1999-2007 Change
Scotland	0.26	0.30	0.28	0.28	0.30	0.30	0.31	0.27	0.29	0.03
UK	0.22	0.23	0.18	0.16	0.18	0.18	0.18	0.17	0.16	-0.06
Germany	0.33	0.33	0.34	0.34	0.34	0.34	0.35	0.35	0.35	0.02
France	0.39	0.37	0.36	0.37	0.36	0.37	0.37	0.35	0.34	-0.05
Italy	0.20	0.20	0.20	0.20	0.19	0.20	0.19	0.20	0.21	0.01
Japan	0.30	0.30	0.30	0.30	0.30	0.30	0.28	0.28	0.27	-0.03
Canada	0.21	0.22	0.21	0.21	0.19	0.18	0.20	0.20	0.19	-0.02
USA	0.29	0.28	0.31	0.32	0.33	0.31	0.31	0.30	0.29	0.00
Denmark	0.32	0.28	0.28	0.18	0.18	0.17	0.16	0.16	0.18	-0.14
Iceland	0.69	0.68	0.59	0.72	0.70	..	0.65	0.61	0.49	-0.20
Ireland	0.07	0.09	0.09	0.10	0.09	0.09	0.09	0.08	0.09	0.02
Norway	0.25	..	0.23	0.26	0.26	0.25	0.24	0.24	0.25	0.00
Finland	0.36	0.35	0.34	0.35	0.33	0.33	0.33	0.32	0.29	-0.07
Sweden	0.12	..	0.12	..	0.13	0.11	0.18	0.17	0.17	0.05
EU 27	0.25	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	-0.01
OECD	0.27	0.26	0.27	0.27	0.27	0.27	0.26	0.26	0.25	-0.02

Source: OECD MSTI 2009/1, ONS & Scottish Government

1 .. Data not available

2 The EU expanded from 25 to 27 nations in 2007. These figures are for the 27 nations.

TABLE 6D
GROSS EXPENDITURE ON R&D PERFORMED IN SELECTED OECD COUNTRIES:
AS A PERCENTAGE OF GDP, 1999 to 2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percentage 1999-2007 Change
Scotland	1.32	1.38	1.57	1.58	1.47	1.42	1.50	1.43	1.52	0.20
UK	1.80	1.79	1.80	1.76	1.71	1.67	1.74	1.74	1.79	-0.01
Germany	2.40	2.45	2.46	2.49	2.52	2.49	2.48	2.54	2.54	0.14
France	2.16	2.15	2.20	2.23	2.17	2.15	2.10	2.10	2.08	-0.08
Italy	1.02	1.05	1.09	1.13	1.11	1.10	1.09	1.13	..	..
Japan	3.02	3.04	3.12	3.17	3.20	3.17	3.32	3.40	3.44	0.42
Canada	1.80	1.91	2.09	2.04	2.04	2.08	2.05	1.98	1.88	0.08
USA	2.66	2.75	2.76	2.66	2.66	2.59	2.62	2.66	2.68	0.02
Denmark	2.18	..	2.39	2.51	2.58	2.48	2.46	2.48	2.55	0.37
Iceland	2.30	2.67	2.95	2.95	2.82	..	2.77	2.99	2.75	0.45
Ireland	1.18	1.12	1.10	1.10	1.17	1.24	1.25	1.30	1.31	0.13
Norway	1.64	..	1.59	1.66	1.71	1.59	1.52	1.52	1.64	0.00
Finland	3.16	3.35	3.30	3.36	3.43	3.45	3.48	3.45	3.47	0.31
Sweden	3.61	..	4.17	..	3.85	3.62	3.60	3.74	3.60	-0.01
EU 27	1.72	1.74	1.75	1.76	1.75	1.73	1.73	1.76	1.77	0.05
OECD	2.17	2.21	2.25	2.22	2.22	2.19	2.23	2.26	2.29	0.12

Source: OECD MSTI 2009/1, ONS and Scottish Government

1 .. Data not available

2 The EU expanded from 25 to 27 nations in 2007. These figures are for the 27 nations.

3 Scottish GERD excludes the private non-profit sector.

TABLE 7
SOURCES OF FUNDS FOR R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
1997 TO 2007

	£ thousands										
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Government	58 427	77 992	58 105	60 520	43 406	18 313	17 531	25 197	33 184	32 690	54 903
Overseas total	71 231	79 008	69 437	50 514	87 683	55 399	51 007	92 876	112 310	106 602	138 613
of which:											
European Commission grants	3 452	5 445	4 596	4 966	2 864	4 326	2 148	422	504	579	462
Other Overseas	67 779	73 564	64 841	45 548	84 819	51 073	48 859	92 454	111 806	106 023	138 151
Other UK Business	..	33 697	85 566	87 781	92 907	99 447	93 765	91 068	111 669	70 931	64 060
Own funds	133 412	166 816	180 290	201 040	292 454	333 461	278 889	221 169	249 254	250 928	255 299
Other	..	1	9	4	219	90	71	69	43	34	245
GRAND TOTAL	290 835	357 514	393 408	399 858	516 669	506 710	441 265	430 379	506 459	461 185	513 121

	Percentages										
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Government	20	22	15	15	8	4	4	6	7	7	11
Overseas total	24	22	18	13	17	11	12	22	22	23	27
of which:											
European Commission grants	1	2	1	1	1	1	-	-	-	-	-
Other Overseas	23	21	16	11	16	10	11	21	22	23	27
Other UK Business	..	9	22	22	18	20	21	21	22	15	12
Own funds	46	47	46	50	57	66	63	51	49	54	50
Other	..	-	-	-	-	-	-	-	-	-	-
TOTAL	100	100	100	100	100	100	100	100	100	100	100

Source: Office for National Statistics

1 .. denotes disclosive value

2 - denotes nil, figures unavailable or too small to display

TABLE 8
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND BY TOTAL
COMPANY EMPLOYMENT SIZEBANDS: BROAD PRODUCT GROUPS, 2007

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
Manufacturing: Total	52 312	64 294	302 529	419 135
Chemicals	16 151	19 444	106 461	142 055
Mechanical engineering	4 661	8 264	9 534	22 459
Electrical machinery	14 719	25 554	66 304	106 577
Transport equipment & aerospace	732	2 107	6 431	9 270
Other manufactured products	16 049	8 926	113 799	138 774
Services	36 474	10 358	5 708	52 540
Other: Total	1 558	..	..	41 446
Agriculture, hunting & forestry; Fishing	596	..	..	..
Extractive industries	655	1 424	28 641	30 720
Electricity, gas & water supply	..	..	..	..
Construction	306	..	..	1 326
GRAND TOTAL	90 344	81 699	341 078	513 121

Source: Office for National Statistics

1 .. denotes disclosive value

2 Transport equipment and Aerospace have been combined to prevent disclosive data

TABLE 9
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND BY COUNTRY
OF OWNERSHIP OF BUSINESS PERFORMING R&D: BROAD PRODUCT GROUPS, 2007

	Country of Ownership					Total
	Scotland	Rest of the UK	United States	Other EU	Rest of the World	
Manufacturing: Total	96 957	12 621	187 617	111 278	10 662	419 135
Chemicals	20 539	..	79 270	..	..	142 055
Mechanical engineering	11 933	656	6 970	1 918	..	22 459
Electrical machinery	37 801	9 117	46 552	..	507	106 577
Transport equipment & aerospace	5 687	1 222	..	-	..	9 270
Other manufactured products	20 997	..	..	57 728	6 558	138 774
Services	41 057	..	5 026	..	..	52 540
Other: Total	11 514	..	5 236	..	..	41 446
Agriculture, hunting & forestry; Fishing	..	..	..	-	-	..
Extractive industries	10 433	..	..	..	..	30 720
Electricity, gas & water supply	..	..	-	..	..	..
Construction	485	..	..	-	-	1 326
GRAND TOTAL	149 528	28 066	197 879	120 254	17 394	513 121

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display

2 .. denotes disclosive value

3 Transport equipment and Aerospace have been combined to prevent disclosive data

TABLE 10
EXPENDITURE ON R&D PERFORMED WITHIN BUSINESSES IN SCOTLAND:
UNITARY AUTHORITY LEVEL, 2001 TO 2007

	£ thousands						
	2001	2002	2003	2004	2005	2006	2007
Aberdeen City	22 992	29 977	27 918	26 186	36 724	37 507	51 948
Aberdeenshire	4 660	6 263	4 687	4 435	7 329	5 818	6 244
Angus	802	..	1 538	2 145	1 960	1 474	2 115
Argyll & Bute	..	1 001	874	797	561	477	429
Clackmannanshire	..	..	..	..	716	658	618
Dumfries & Galloway	..	1 791	3 387	1 706	2 264	2 980	2 676
Dundee City	46 474	55 485	40 048	48 807	42 208	42 197	42 790
East Ayrshire	1 553	1 346	984	1 602	1 981	2 029	1 470
East Dunbartonshire	749	1 150	1 202	774	772	1 010	215
East Lothian	..	..	393	..	3 995	5 527	1 881
East Renfrewshire	..	..	..	1 776	1 436	..	..
Edinburgh-City of	197 708	139 145	130 294	101 188	103 266	106 455	147 168
Eilean Siar	..	..	..	..	..	..	..
Falkirk	..	12 759	12 574	9 763	7 042	3 843	11 402
Fife	11 361	13 874	9 631	19 998	23 741	18 029	18 640
Glasgow City	12 918	19 322	17 167	25 279	25 770	23 724	22 547
Highland	..	11 849	12 668	..	..	..	23 077
Inverclyde	..	..	..	..	..	..	..
Midlothian	6 787	23 497	21 292	3 587	2 386	1 775	10 863
Moray	..	..	507	665	950	664	609
North Ayrshire	2 466	..	770	1 803	856	934	975
North Lanarkshire	43 465	54 954	49 382	46 656	65 526	64 199	72 984
Orkney Islands	..	..	..	..	..	194	..
Perth & Kinross	586	779	524	668	990	956	1 186
Renfrewshire	11 176	12 435	9 562	10 123	14 129	11 819	14 630
Scottish Borders, The	..	1 222	1 317	4 458	1 436	1 913	2 120
Shetland Islands	-	..	..	137	..	170	..
South Ayrshire	..	1 151	866	627	1 130	734	1 595
South Lanarkshire	25 613	39 874	33 282	28 050	41 889	37 047	24 492
Stirling	1 160	2 267	1 974	1 791	2 442	1 769	3 456
West Dunbartonshire	..	4 423	..	2 460	3 192	2 530	2 343
West Lothian	59 722	54 622	48 885	56 807	..	44 625	39 467
GRAND TOTAL	516 669	506 710	441 265	430 379	506 459	461 185	513 121

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display

2 .. denotes disclosive value

BACKGROUND NOTES

1. This publication presents the most recent data for BERD and GERD in 2007. The BERD figures for 2001 to 2006 have been revised and as a consequence the GERD figures for this period have also been revised.

2. The ONS R&D survey follows the definition of research and development proposed by the Organisation for Economic Cooperation and Development (OECD) and published in the 'Frascati' Manual. According to the manual, R&D is defined as:

“Creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of the stock of knowledge to devise new applications.”

The definition therefore excludes activities such as market research, most software development, routine testing and quality control and artistic design work.

3. Further information on BERD can be found at:

<http://www.statistics.gov.uk/STATBASE/Product.asp?vlnk=8206>

4. Further information on GERD can be found at:

<http://www.statistics.gov.uk/statbase/Product.asp?vlnk=418>

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