Australian Bureau of Statistics

2004–05 **8112.0**

RESEARCH AND EXPERIMENTAL DEVELOPMENT

AUSTRALIA

ALL SECTOR SUMMARY

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INQUIRIES

For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070 or Kirsty Rothenbury on Perth (08) 9360 5382.

NOTES

CHANGES IN THIS ISSUE

Changes have been made to the format and content of this publication. Cross-classifications of data included in previous issues may be available on request.

DATA QUALITY

When interpreting the results in this publication it is important to take into account factors that may affect the reliability of estimates. These factors are described in the Non-sampling error section of the Technical note.

While no revisions to previous cycle data have been applied to the Higher education, Government and Private non-profit sectors, there have been significant revisions to 2002–03 Business sector data. See the Revisions section of the Technical note for further detail.

ABBREVIATIONS

$'000	thousand dollars
$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZSIC	Australian and New Zealand Standard Industrial Classification
GDP	gross domestic product
GERD	gross expenditure on R&D
GSP	gross state product
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Co-operation and Development
PYE	person years of effort
Qld	Queensland
R&D	research and experimental development
SA	South Australia
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia

Dennis Trewin
Australian Statistician

EXPENDITURE ON R&D

In 2004–05, Gross expenditure on R&D (GERD) was $15,772.9 million. This represented an increase of 19.4% ($2,561.3 million) over 2002–03.

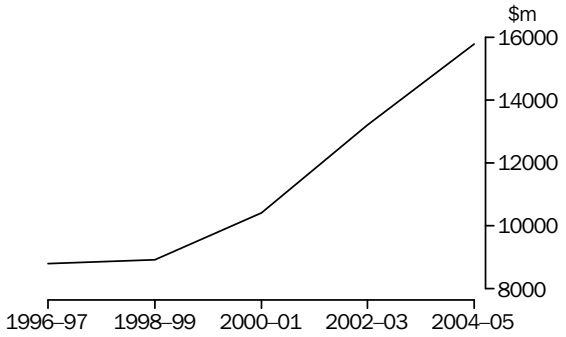
GROSS EXPENDITURE ON R&D, by sector

	1996–97	*1998–99*	*2000–01*	*2002–03*	*2004–05*
	$m	$m	$m	$m	$m
Business	4 234.7	4 094.7	4 982.6	r6 940.3	8 446.2
Government					
Commonwealth	1 266.6	1 179.4	1 404.8	1 531.3	1 573.4
State/territory	797.7	863.6	951.0	950.9	977.3
Total	*2 064.3*	*2 043.1*	*2 355.8*	*2 482.2*	*2 550.7*
Higher education	2 307.6	2 555.1	2 789.8	3 429.6	4 282.8
Private non-profit	185.8	225.3	289.0	359.5	493.2
Total	**8 792.4**	**8 918.2**	**10 417.2**	r**13 211.6**	**15 772.9**

r revised

Since 1996–97, GERD has increased by an average of 9.9% per year.

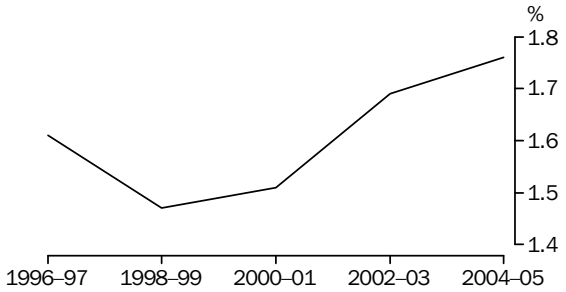
GROSS EXPENDITURE ON R&D



GERD AS A PROPORTION OF GDP

GERD represented 1.76% of Gross domestic product (GDP) in 2004–05, up from 1.69% in 2002–03.

GERD AS A PROPORTION OF GDP(a)



(a) See paragraph 4 of the Explanatory notes.

Australia's GERD/GDP ratio remained below the OECD average of 2.26%. The following table shows the GERD/GDP ratios for selected OECD countries.

GERD AS A PROPORTION OF GDP *continued*

GERD/GDP RATIOS OF OECD COUNTRIES

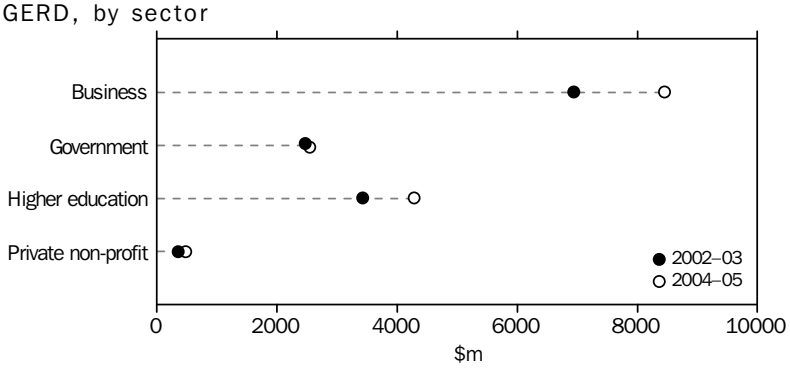
	2000-01	*2001-02*	*2002-03*	*2003-04*	*2004-05*
	%	%	%	%	%
Sweden	na	4.25	na	3.95	na
Finland	3.38	3.38	3.43	3.48	3.51
Japan	2.99	3.07	3.12	3.15	3.13
Iceland	2.73	3.04	3.08	2.92	na
Korea	2.39	2.59	2.53	2.63	2.85
United States of America	2.74	2.76	2.65	2.68	2.68
Germany	2.45	2.46	2.49	2.52	2.49
Denmark	na	2.39	2.51	2.56	2.48
Austria	1.91	2.03	2.12	2.20	2.24
France	2.15	2.20	2.23	2.18	2.16
Canada	1.94	2.13	2.06	2.00	1.99
Belgium	1.97	2.08	1.94	1.89	1.90
United Kingdom	1.86	1.87	1.89	1.88	na
Netherlands	1.82	1.80	1.72	1.76	1.78
Australia	**1.51**	**na**	r**1.69**	**na**	**1.76**
Norway	na	1.60	1.67	1.73	1.61
Czech Republic	1.23	1.22	1.22	1.26	1.27
Ireland	1.13	1.10	1.10	1.16	1.20
New Zealand	na	1.13	na	1.14	na
Italy	1.05	1.09	1.13	1.11	na
Spain	0.91	0.92	0.99	1.05	1.07
Hungary	0.79	0.94	1.01	0.94	0.89
Portugal	0.80	0.85	0.80	0.78	na
Turkey	0.64	0.72	0.66	na	na
Greece	na	0.65	na	0.62	na
Poland	0.66	0.64	0.58	0.56	0.58
Slovak Republic	0.65	0.64	0.58	0.58	0.53
Mexico	0.37	0.39	0.44	0.43	na
Total OECD	**2.23**	**2.27**	**2.24**	**2.25**	**2.26**

na not available
r revised
Source: Main Science and Technology Indicators, 2006/1, OECD, Paris, 2006

Sector

The Business sector accounted for the largest proportion of GERD in 2004–05 (53.5% or $8,446.2 million) followed by the Higher education sector (27.2% or $4,282.8 million). These two sectors also recorded the strongest growth in absolute terms between 2002–03 and 2004–05 (up $1,506.0 million and $853.2 million respectively).

GERD, by sector



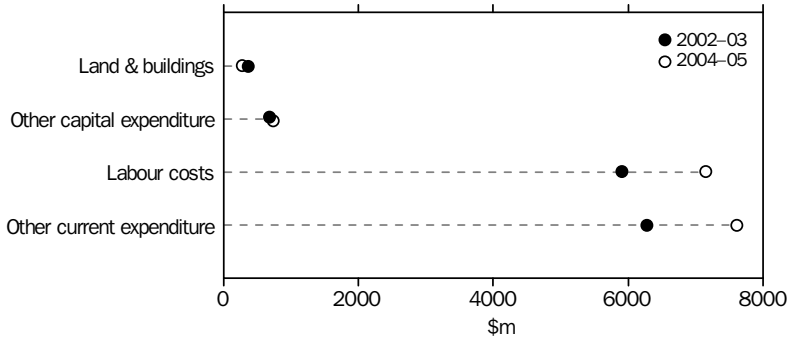
Percentage growth in expenditure on R&D since 2002–03 was highest for the Private non-profit sector (up 37.2% or $133.6 million) and lowest for the Government sector (up 2.8% or $68.6 million).

Type of expenditure

In 2004–05, Current expenditure accounted for 93.5% or $14,754.7 million of GERD, which in turn was comprised of $7,145.0 million in Labour costs and $7,609.7 million in Other current expenditure. Capital expenditure totalled $1,018.2 million over the period.

Growth in GERD since 2002–03 was driven by a 21.3% ($2,586.8 million) increase in Current expenditure. Capital expenditure decreased by 2.4% ($25.5 million).

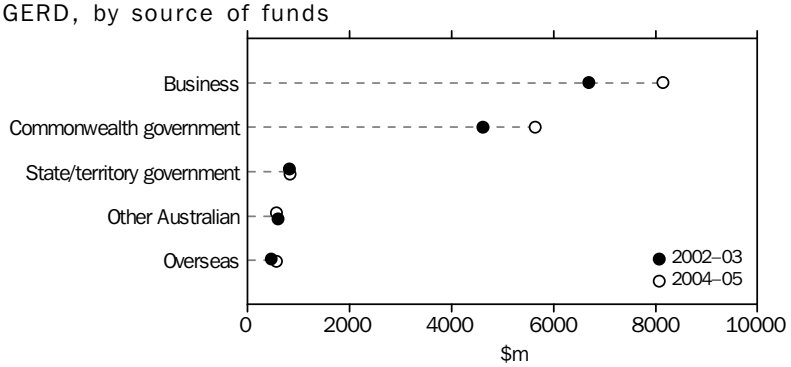
GERD, by type of expenditure



Source of funds

The major sources of funds for R&D in 2004–05 were Business (51.6% or $8,145.8 million) and the Commonwealth government (35.8% or $5,639.8 million). These two sources also recorded the largest absolute increases since 2002–03 (up $1,449.7 million and $1025.8 million respectively).

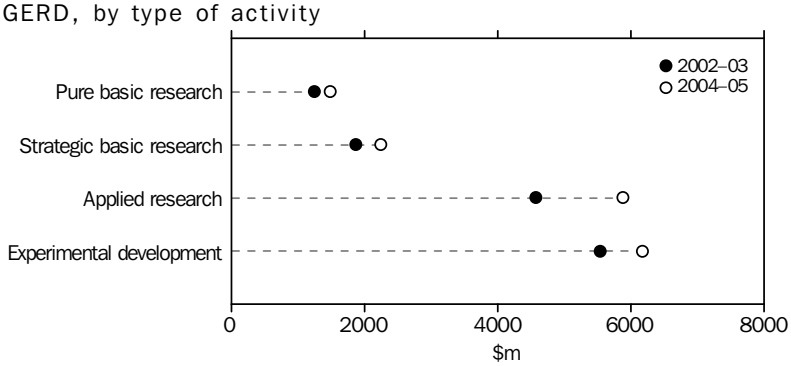
GERD, by source of funds



Type of activity

In 2004–05, the majority of GERD was directed into Experimental development (39.1% or $6,174.3 million) and Applied research (37.2% or $5,873.3 million). Applied research showed the strongest growth from 2002–03, increasing by $1,307.2 million (28.6%). Pure basic research recorded the lowest growth increasing by $237.6 million (19.1%).

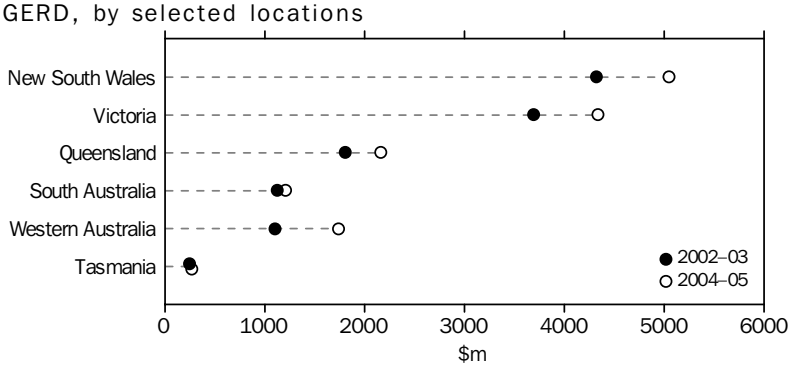
GERD, by type of activity



Location

Locations in New South Wales and Victoria accounted for over half (59.5%) of GERD in 2004–05 ($5,047.5 million and $4,337.7 million respectively). New South Wales and Victoria also recorded the highest growth since 2002–03, increasing by $726.0 million and $649.0 million respectively. However, Western Australia recorded the fastest growth over the period, increasing by 57.4% (or $633.7 million).

GERD, by selected locations



In 2004–05, GERD as a proportion of Gross State Product (GSP) was highest for the Australian Capital Territory (4.24%) and South Australia (2.02%). Western Australia reported the largest growth in GERD as a proportion of GSP, increasing from 1.29% in 2002–03 to 1.72% in 2004–05.

GERD AS A PROPORTION OF GSP(a), by location

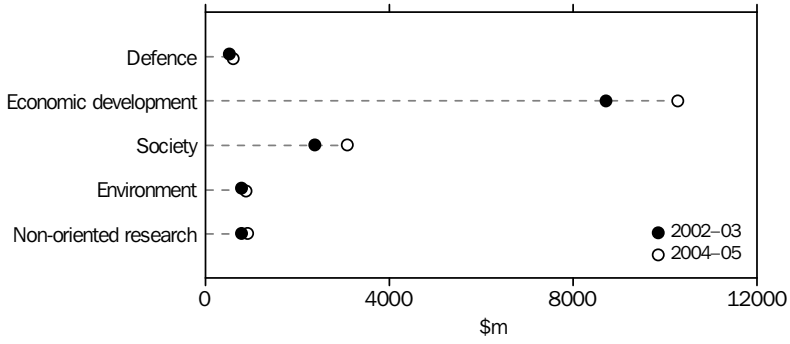
	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	%	%	%	%	%	%	%	%
2002–03	1.57	1.87	1.36	2.10	1.29	1.83	1.36	np
2004–05	1.65	1.95	1.36	2.02	1.72	1.68	np	4.24

np not available for publication but included in totals where applicable, unless otherwise indicated
(a) See paragraph 4 of the Explanatory notes.

Socio-economic objective (SEO)

In 2004–05, almost two thirds of GERD was directed into the Economic development SEO (65.2% or $10,281.8 million). The next most prevalent SEOs were Society (19.6% or $3,089.8 million) and Non-oriented (5.8% or $913.2 million). The distribution of GERD across SEOs was largely unchanged from 2002–03.

GERD, by socio-economic objective



Research field

As in previous years, the major research fields varied between sectors. Engineering and technology accounted for the largest share of R&D expenditure in the Business sector (57.1% or $4,820.3 million), while the largest share of Government sector R&D expenditure was directed into Agricultural, veterinary and environmental sciences (29.9% or $761.8 million). Medical and health sciences was the major research field for both the Higher education (25.3% or $1,082.4 million) and Private non-profit sectors (72.3% or $356.7 million).

HUMAN RESOURCES DEVOTED TO R&D

Human resources devoted to R&D in 2004–05 totalled 119,384 person years of effort (PYE), an increase of 11.4% (12,175 PYE) since 2002–03.

HUMAN RESOURCES DEVOTED TO R&D, by sector

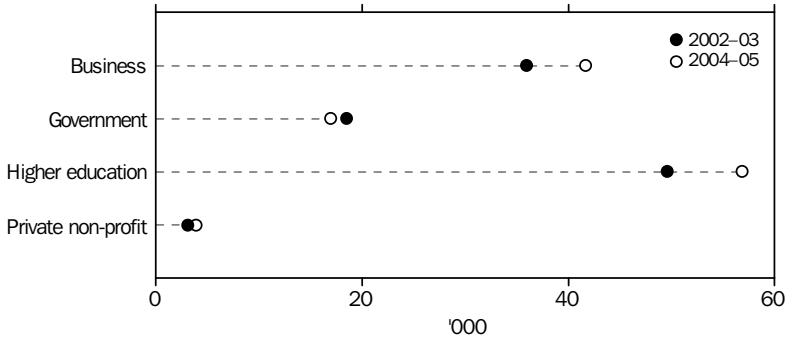
	1996–97	*1998–99*	*2000–01*	*2002–03*	*2004–05*
	PYE	PYE	PYE	PYE	PYE
Business	26 412	25 109	28 391	r35 939	41 656
Government					
Commonwealth	10 377	9 353	9 565	10 185	9 335
State/territory	8 813	9 069	8 587	8 357	7 654
Total	*19 190*	*18 422*	*18 152*	*18 541*	*16 989*
Higher education	42 739	45 502	46 287	49 612	56 809
Private non-profit	2 351	2 551	2 791	3 117	3 930
Total	**90 692**	**91 583**	**95 621**	r**107 209**	**119 384**

r revised

Sector

The large majority of Human resources devoted to R&D in 2004–05 came from the Higher education (47.6% or 56,809 PYE) and Business (34.9% or 41,656 PYE) sectors. Together these two sectors accounted an increase of 12,914 PYE devoted to R&D between 2002–03 and 2004–05. However, this growth was partly offset by a decrease of 1,552 PYE for the Government sector over the period.

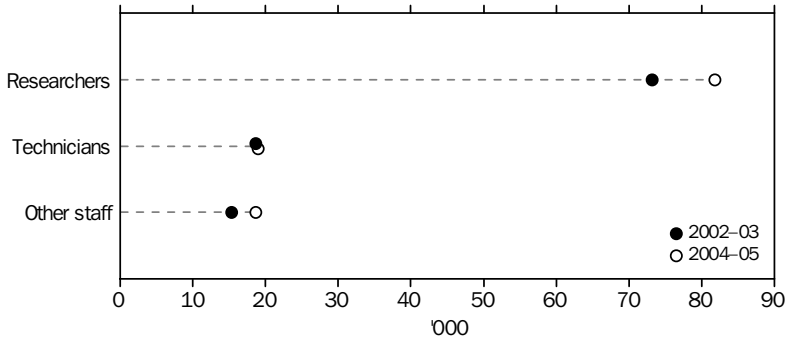
HUMAN RESOURCES DEVOTED TO R&D, by sector: **PYE**



Type of resource

Researchers accounted for over two thirds of the total Human resources devoted to R&D in 2004–05 (68.5% or 81,739 PYE). Since 2002–03, Researcher effort devoted to R&D has increased by 11.7% (8,566 PYE). The next highest growth occurred for Other staff (up 3,262 PYE or 21.2%).

HUMAN RESOURCES DEVOTED TO R&D, by type of resource: **PYE**



1 EXPENDITURE ON R&D, by sector—by type of expenditure

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
2004–05							
Capital expenditure							
Land, buildings & other structures	104 760	43 704	28 563	72 267	91 003	9 783	277 813
Other	418 837	67 440	40 184	107 624	184 059	29 849	740 369
Total	*523 597*	*111 144*	*68 747*	*179 891*	*275 062*	*39 632*	*1 018 182*
Current expenditure							
Labour costs	3 661 774	916 384	532 557	1 448 941	1 789 158	245 134	7 145 007
Other	4 260 873	545 859	376 022	921 881	2 218 561	208 394	7 609 710
Total	*7 922 647*	*1 462 243*	*908 579*	*2 370 822*	*4 007 719*	*453 528*	*14 754 716*
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
2002–03							
Capital expenditure							
Land, buildings & other structures	115 908	88 206	11 934	100 140	131 220	13 738	361 006
Other	360 987	92 531	24 983	117 514	176 696	27 480	682 677
Total	*476 895*	*180 737*	*36 916*	*217 653*	*307 916*	*41 218*	*1 043 683*
Current expenditure							
Labour costs	2 995 386	785 516	501 811	1 287 327	1 436 779	178 757	5 898 249
Other	3 468 011	565 057	412 124	977 181	1 684 902	139 572	6 269 666
Total	*6 463 397*	*1 350 572*	*913 935*	*2 264 508*	*3 121 681*	*318 329*	*12 167 915*
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

2 EXPENDITURE ON R&D, by sector—by type of expenditure: **proportions**

	BUSINESS	GOVERNMENT			HIGHER EDUCATION	PRIVATE NON-PROFIT	TOTAL
		Commonwealth	State/territory	Total			
	%	%	%	%	%	%	%
2004–05							
Capital expenditure							
Land, buildings & other structures	1.2	2.8	2.9	2.8	2.1	2.0	1.8
Other	5.0	4.3	4.1	4.2	4.3	6.1	4.7
Total	*6.2*	*7.1*	*7.0*	*7.1*	*6.4*	*8.0*	*6.5*
Current expenditure							
Labour costs	43.4	58.2	54.5	56.8	41.8	49.7	45.3
Other	50.4	34.7	38.5	36.1	51.8	42.3	48.2
Total	*93.8*	*92.9*	*93.0*	*92.9*	*93.6*	*92.0*	*93.5*
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
2002–03							
Capital expenditure							
Land, buildings & other structures	1.7	5.8	1.3	4.0	3.8	3.8	2.7
Other	5.2	6.0	2.6	4.7	5.2	7.6	5.2
Total	*6.9*	*11.8*	*3.9*	*8.8*	*9.0*	*11.5*	*7.9*
Current expenditure							
Labour costs	43.2	51.3	52.8	51.9	41.9	49.7	44.6
Other	50.0	36.9	43.3	39.4	49.1	38.8	47.5
Total	*93.1*	*88.2*	*96.1*	*91.2*	*91.0*	*88.5*	*92.1*
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

3 EXPENDITURE ON R&D, by sector—by source of funds

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
				2004–05			
Business	7 718 111	79 076	64 221	143 297	243 169	41 190	8 145 767
Commonwealth government(a)	330 895	1 334 046	156 487	1 490 533	3 669 316	149 099	5 639 844
State & local government	30 659	43 416	570 645	614 061	148 124	49 194	842 038
Other Australian	50 804	79 929	159 229	239 158	93 803	192 199	575 965
Overseas	315 774	36 920	26 744	63 664	128 368	61 478	569 284
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
				2002–03			
Business	6 362 037	78 044	50 256	128 300	174 093	31 594	6 696 024
Commonwealth government(a)	248 957	1 255 884	67 373	1 323 257	2 937 893	103 939	4 614 047
State & local government	11 915	39 624	630 271	669 895	104 494	39 821	826 124
Other Australian	44 241	123 709	189 265	312 974	98 488	147 300	603 003
Overseas	273 142	34 048	13 686	47 734	114 629	36 894	472 400
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

(a) For the Higher education sector this includes General university funds, which are mainly sourced from the Commonwealth government.

4 EXPENDITURE ON R&D, by sector—by source of funds: **proportions**

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	%	%	%	%	%	%	%
				2004–05			
Business	91.4	5.0	6.6	5.6	5.7	8.4	51.6
Commonwealth government(a)	3.9	84.8	16.0	58.4	85.7	30.2	35.8
State & local government	0.4	2.8	58.4	24.1	3.5	10.0	5.3
Other Australian	0.6	5.1	16.3	9.4	2.2	39.0	3.7
Overseas	3.7	2.3	2.7	2.5	3.0	12.5	3.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
				2002–03			
Business	91.7	5.1	5.3	5.2	5.1	8.8	50.7
Commonwealth government(a)	3.6	82.0	7.1	53.3	85.7	28.9	34.9
State & local government	0.2	2.6	66.3	27.0	3.0	11.1	6.3
Other Australian	0.6	8.1	19.9	12.6	2.9	41.0	4.6
Overseas	3.9	2.2	1.4	1.9	3.3	10.3	3.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) For the Higher education sector this includes General university funds, which are mainly sourced from the Commonwealth government.

5 EXPENDITURE ON R&D, by sector—by type of activity

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
2004–05							
Pure basic research	69 927	82 222	54 930	137 153	1 229 796	47 320	1 484 196
Strategic basic research	321 950	541 136	213 056	754 192	978 809	186 141	2 241 091
Applied research	2 607 541	736 066	585 832	1 321 897	1 745 599	198 234	5 873 271
Experimental development	5 446 827	213 963	123 508	337 471	328 578	61 465	6 174 341
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
2002–03							
Pure basic research	56 402	99 014	53 213	152 227	975 286	62 692	1 246 607
Strategic basic research	312 676	471 025	131 482	602 507	802 881	150 155	1 868 219
Applied research	1 727 659	689 375	648 877	1 338 252	1 390 706	109 485	4 566 101
Experimental development	4 843 555	271 895	117 280	389 176	260 725	37 216	5 530 671
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

6 EXPENDITURE ON R&D, by sector—by type of activity: **proportions**

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	%	%	%	%	%	%	%
2004–05							
Pure basic research	0.8	5.2	5.6	5.4	28.7	9.6	9.4
Strategic basic research	3.8	34.4	21.8	29.6	22.9	37.7	14.2
Applied research	30.9	46.8	59.9	51.8	40.8	40.2	37.2
Experimental development	64.5	13.6	12.6	13.2	7.7	12.5	39.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
2002–03							
Pure basic research	0.8	6.5	5.6	6.1	28.4	17.4	9.4
Strategic basic research	4.5	30.8	13.8	24.3	23.4	41.8	14.1
Applied research	24.9	45.0	68.2	53.9	40.6	30.5	34.6
Experimental development	69.8	17.8	12.3	15.7	7.6	10.4	41.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

7 EXPENDITURE ON R&D, by sector—by location(a)

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
				2004–05			
New South Wales	3 156 963	261 648	298 996	560 644	1 192 817	137 072	5 047 496
Victoria	2 405 046	406 158	201 924	608 082	1 052 611	271 987	4 337 726
Queensland	1 037 227	159 426	234 938	394 364	715 574	13 052	2 160 217
South Australia	530 341	242 266	104 552	346 818	325 383	7 028	1 209 570
Western Australia	1 051 191	105 607	100 974	206 580	442 283	37 866	1 737 920
Tasmania	73 580	109 453	3 564	113 017	83 672	199	270 468
Northern Territory	30 857	28 205	24 671	52 876	33 022	np	np
Australian Capital Territory	75 979	257 319	2 851	260 170	437 420	3 199	776 768
Australian External Territories	—	545	—	545	—	—	545
Overseas	85 060	2 761	4 856	7 616	—	np	np
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
				2002–03			
New South Wales	2 715 399	267 382	270 693	538 075	991 884	76 168	4 321 527
Victoria	2 048 823	374 968	170 277	545 246	863 174	231 474	3 688 717
Queensland	819 756	147 701	255 288	402 989	574 285	9 647	1 806 677
South Australia	539 969	225 466	96 617	322 082	257 957	6 135	1 126 143
Western Australia	588 535	89 099	108 114	197 213	296 117	22 388	1 104 252
Tasmania	60 862	109 668	8 801	118 469	67 714	235	247 280
Northern Territory	np	20 622	29 439	50 061	27 329	np	123 065
Australian Capital Territory	43 155	290 553	6 528	297 081	351 136	np	np
Australian External Territories	np	4 379	564	4 943	—	—	np
Overseas	83 452	1 472	4 531	6 003	—	3 528	92 983
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) See paragraph 9 of the Explanatory notes.

8 EXPENDITURE ON R&D, by sector—by location(a): **proportions**

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	%	%	%	%	%	%	%
2004–05							
New South Wales	37.4	16.6	30.6	22.0	27.9	27.8	32.0
Victoria	28.5	25.8	20.7	23.8	24.6	55.2	27.5
Queensland	12.3	10.1	24.0	15.5	16.7	2.6	13.7
South Australia	6.3	15.4	10.7	13.6	7.6	1.4	7.7
Western Australia	12.4	6.7	10.3	8.1	10.3	7.7	11.0
Tasmania	0.9	7.0	0.4	4.4	2.0	—	1.7
Northern Territory	0.4	1.8	2.5	2.1	0.8	np	np
Australian Capital Territory	0.9	16.4	0.3	10.2	10.2	0.6	4.9
Australian External Territories	—	—	—	—	—	—	—
Overseas	1.0	0.2	0.5	0.3	—	np	np
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
2002–03							
New South Wales	39.1	17.5	28.5	21.7	28.9	21.2	32.7
Victoria	29.5	24.5	17.9	22.0	25.2	64.4	27.9
Queensland	11.8	9.6	26.8	16.2	16.7	2.7	13.7
South Australia	7.8	14.7	10.2	13.0	7.5	1.7	8.5
Western Australia	8.5	5.8	11.4	7.9	8.6	6.2	8.4
Tasmania	0.9	7.2	0.9	4.8	2.0	0.1	1.9
Northern Territory	np	1.3	3.1	2.0	0.8	np	0.9
Australian Capital Territory	0.6	19.0	0.7	12.0	10.2	np	np
Australian External Territories	np	0.3	0.1	0.2	—	—	np
Overseas	1.2	0.1	0.5	0.2	—	1.0	0.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) See paragraph 9 of the Explanatory notes.

9 EXPENDITURE ON R&D, by sector—by socio-economic objective

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
2004–05							
DEFENCE	263 620	309 367	—	309 367	28 857	—	601 844
ECONOMIC DEVELOPMENT							
Plant production & plant primary products	108 091	131 385	206 154	337 539	145 694	np	np
Animal prod. & animal primary products	52 689	99 692	186 855	286 547	88 120	—	427 356
Mineral resources (excl. energy)	771 064	91 103	6 331	97 434	62 105	—	930 602
Energy resources	660 240	59 251	6 526	65 777	41 108	—	767 125
Energy supply	233 433	32 505	2 072	34 577	40 052	—	308 062
Manufacturing	3 259 869	217 025	15 725	232 750	262 808	np	np
Construction	368 560	41 872	4 012	45 884	67 560	—	482 005
Transport	153 101	8 604	4 224	12 828	35 675	—	201 604
Information & communication services	1 200 955	66 808	2 112	68 920	212 528	45	1 482 448
Commercial services & tourism	955 187	6 464	1 199	7 663	71 821	np	np
Economic framework	20 284	55 123	3 114	58 237	216 014	86	294 620
Total	*7 783 473*	*809 830*	*438 325*	*1 248 156*	*1 243 485*	*6 728*	*10 281 842*
SOCIETY							
Health	277 159	46 824	302 275	349 098	1 196 995	458 738	2 281 991
Education & training	14 495	1 315	3 761	5 076	195 127	np	np
Social development & community services	32 406	36 629	32 581	69 210	466 046	np	np
Total	*324 060*	*84 767*	*338 617*	*423 384*	*1 858 168*	*484 195*	*3 089 807*
ENVIRONMENT							
Environmental policy frameworks & other aspects	7 697	24 959	19 637	44 596	39 443	np	np
Environmental management	62 203	306 679	165 803	472 482	257 567	np	np
Total	*69 900*	*331 638*	*185 440*	*517 078*	*297 010*	*2 237*	*886 226*
NON-ORIENTED RESEARCH	5 191	37 784	14 944	52 728	855 260	—	913 179
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
2002–03							
DEFENCE	232 973	283 854	—	283 854	10 942	—	527 769
ECONOMIC DEVELOPMENT							
Plant production & plant primary products	75 910	125 260	252 100	377 360	115 779	np	np
Animal prod. & animal primary products	44 058	96 072	181 488	277 560	76 649	np	np
Mineral resources (excl. energy)	594 477	90 091	7 561	97 652	58 824	—	750 952
Energy resources	454 152	56 506	2 468	58 973	35 032	—	548 157
Energy supply	186 290	26 345	37	26 382	40 567	np	np
Manufacturing	2 673 730	209 542	23 899	233 441	200 628	5 155	3 112 954
Construction	227 093	34 554	3 894	38 448	62 132	53	327 726
Transport	103 719	3 759	11 527	15 286	28 538	np	np
Information & communication services	1 206 506	49 750	3 140	52 890	161 797	np	np
Commercial services & tourism	801 004	12 987	14 072	27 059	42 586	4	870 653
Economic framework	13 485	131 286	4 372	135 658	169 314	155	318 612
Total	*6 380 424*	*836 152*	*504 557*	*1 340 710*	*991 845*	*11 211*	*8 724 189*
SOCIETY							
Health	226 451	24 943	203 046	227 989	970 399	323 956	1 748 795
Education & training	13 346	1 946	9 775	11 721	160 840	20 094	206 001
Social development & community services	26 224	30 939	28 981	59 919	342 985	1 855	430 984
Total	*266 021*	*57 828*	*241 801*	*299 629*	*1 474 224*	*345 905*	*2 385 779*
ENVIRONMENT							
Environmental policy frameworks & other aspects	16 940	17 592	18 060	35 652	34 343	np	np
Environmental management	38 206	302 997	170 082	473 079	186 730	np	np
Total	*55 146*	*320 589*	*188 142*	*508 731*	*221 074*	*1 676*	*786 627*
NON-ORIENTED RESEARCH	5 728	32 886	16 351	49 237	731 512	756	787 234
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

— nil or rounded to zero (including null cells)

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10 EXPENDITURE ON R&D, by sector—by socio-economic objective: **proportions**

	BUSINESS	GOVERNMENT			HIGHER EDUCATION	PRIVATE NON-PROFIT	TOTAL
		Commonwealth	State/territory	Total			
	%	%	%	%	%	%	%
			2004–05				
DEFENCE	3.1	19.7	—	12.1	0.7	—	3.8
ECONOMIC DEVELOPMENT							
Plant production & plant primary products	1.3	8.4	21.1	13.2	3.4	np	np
Animal prod. & animal primary products	0.6	6.3	19.1	11.2	2.1	—	2.7
Mineral resources (excl. energy)	9.1	5.8	0.6	3.8	1.5	—	5.9
Energy resources	7.8	3.8	0.7	2.6	1.0	—	4.9
Energy supply	2.8	2.1	0.2	1.4	0.9	—	2.0
Manufacturing	38.6	13.8	1.6	9.1	6.1	np	np
Construction	4.4	2.7	0.4	1.8	1.6	—	3.1
Transport	1.8	0.5	0.4	0.5	0.8	—	1.3
Information & communication services	14.2	4.2	0.2	2.7	5.0	—	9.4
Commercial services & tourism	11.3	0.4	0.1	0.3	1.7	np	np
Economic framework	0.2	3.5	0.3	2.3	5.0	—	1.9
Total	*92.2*	*51.5*	*44.8*	*48.9*	*29.0*	*1.4*	*65.2*
SOCIETY							
Health	3.3	3.0	30.9	13.7	27.9	93.0	14.5
Education & training	0.2	0.1	0.4	0.2	4.6	np	np
Social development & community services	0.4	2.3	3.3	2.7	10.9	np	np
Total	*3.8*	*5.4*	*34.6*	*16.6*	*43.4*	*98.2*	*19.6*
ENVIRONMENT							
Environmental policy frameworks & other aspects	0.1	1.6	2.0	1.7	0.9	np	np
Environmental management	0.7	19.5	17.0	18.5	6.0	np	np
Total	*0.8*	*21.1*	*19.0*	*20.3*	*6.9*	*0.5*	*5.6*
NON-ORIENTED RESEARCH	0.1	2.4	1.5	2.1	20.0	—	5.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
			2002–03				
DEFENCE	3.4	18.5	—	11.4	0.3	—	4.0
ECONOMIC DEVELOPMENT							
Plant production & plant primary products	1.1	8.2	26.5	15.2	3.4	np	np
Animal prod. & animal primary products	0.6	6.3	19.1	11.2	2.2	np	np
Mineral resources (excl. energy)	8.6	5.9	0.8	3.9	1.7	—	5.7
Energy resources	6.5	3.7	0.3	2.4	1.0	—	4.1
Energy supply	2.7	1.7	—	1.1	1.2	np	np
Manufacturing	38.5	13.7	2.5	9.4	5.8	1.4	23.6
Construction	3.3	2.3	0.4	1.5	1.8	—	2.5
Transport	1.5	0.2	1.2	0.6	0.8	np	np
Information & communication services	17.4	3.2	0.3	2.1	4.7	np	np
Commercial services & tourism	11.5	0.8	1.5	1.1	1.2	—	6.6
Economic framework	0.2	8.6	0.5	5.5	4.9	—	2.4
Total	*91.9*	*54.6*	*53.1*	*54.0*	*28.9*	*3.1*	*66.0*
SOCIETY							
Health	3.3	1.6	21.4	9.2	28.3	90.1	13.2
Education & training	0.2	0.1	1.0	0.5	4.7	5.6	1.6
Social development & community services	0.4	2.0	3.0	2.4	10.0	0.5	3.3
Total	*3.8*	*3.8*	*25.4*	*12.1*	*43.0*	*96.2*	*18.1*
ENVIRONMENT							
Environmental policy frameworks & other aspects	0.2	1.1	1.9	1.4	1.0	np	np
Environmental management	0.6	19.8	17.9	19.1	5.4	np	np
Total	*0.8*	*20.9*	*19.8*	*20.5*	*6.4*	*0.5*	*6.0*
NON-ORIENTED RESEARCH	0.1	2.1	1.7	2.0	21.3	0.2	6.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

11 EXPENDITURE ON R&D, by sector—by research field

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
				2004–05			
Mathematical sciences	14 002	29 142	9 301	38 443	89 734	np	np
Physical sciences	40 657	127 307	231	127 537	150 803	—	318 998
Chemical sciences	211 721	99 439	13 305	112 745	185 850	np	np
Earth sciences	119 974	207 288	22 695	229 982	128 196	np	np
Biological sciences	193 031	165 308	140 295	305 603	450 955	95 887	1 045 477
Information, computing & comm. sciences	2 209 076	123 845	9 447	133 292	204 042	1 730	2 548 139
Engineering & technology	4 820 259	409 565	16 422	425 986	473 870	np	np
Agricultural, veterinary & environ. sciences	224 693	281 700	480 118	761 818	291 847	np	np
Architecture, urban environment & building	21 746	2 693	1 816	4 509	32 391	—	58 646
Medical & health sciences	548 246	49 714	239 874	289 588	1 082 442	356 705	2 276 982
Education	6 822	866	3 598	4 465	150 423	np	np
Economics	5 915	37 108	10 401	47 509	103 218	np	np
Commerce, management, tourism & services	22 530	3 615	2 948	6 563	192 965	103	222 161
Policy & political science	np	104	425	529	76 661	np	78 027
Studies in human society	823	12 940	5 077	18 017	144 525	2 096	165 462
Behavioural & cognitive sciences	862	7 446	1 132	8 577	148 285	1 516	159 240
Law, justice & law enforcement	np	11 780	18 630	30 411	84 956	—	np
Journalism, librarianship & curatorial studies	np	1 047	559	1 606	17 567	—	np
The arts	5 190	185	559	744	87 376	—	93 311
Language & culture	41	305	—	305	82 643	—	82 989
History & archaeology	np	959	494	1 453	74 242	22	np
Philosophy & religion	np	1 032	—	1 032	29 787	240	np
Total	**8 446 244**	**1 573 387**	**977 326**	**2 550 713**	**4 282 781**	**493 160**	**15 772 898**
				2002–03			
Mathematical sciences	30 405	27 233	8 864	36 097	64 002	np	np
Physical sciences	49 501	119 212	424	119 636	129 350	np	np
Chemical sciences	202 666	104 910	16 867	121 777	155 227	4 045	483 715
Earth sciences	120 784	203 871	38 588	242 459	114 108	—	477 351
Biological sciences	189 849	161 720	101 699	263 418	410 155	104 560	967 982
Information, computing & comm. sciences	1 893 760	165 024	16 663	181 687	144 133	4 844	2 224 425
Engineering & technology	3 806 435	393 069	31 374	424 444	374 546	1 465	4 606 890
Agricultural, veterinary & environ. sciences	196 562	243 508	517 798	761 306	235 190	2 087	1 195 144
Architecture, urban environment & building	37 351	2 384	881	3 266	20 509	np	np
Medical & health sciences	378 267	25 964	172 448	198 411	863 816	220 796	1 661 290
Education	2 854	831	8 307	9 138	128 357	np	np
Economics	5 539	49 982	7 736	57 717	83 788	101	147 146
Commerce, management, tourism & services	23 367	3 051	3 538	6 588	137 227	53	167 235
Policy & political science	—	523	3 089	3 611	53 529	632	57 772
Studies in human society	107	8 733	5 375	14 109	111 448	1 206	126 870
Behavioural & cognitive sciences	583	9 105	2 302	11 407	113 275	933	126 198
Law, justice & law enforcement	np	7 116	8 956	16 071	65 764	np	82 896
Journalism, librarianship & curatorial studies	np	926	519	1 444	12 834	—	np
The arts	1 447	40	898	938	66 256	—	68 641
Language & culture	np	—	886	886	64 129	—	np
History & archaeology	np	2 204	3 641	5 845	55 499	—	np
Philosophy & religion	np	1 906	—	1 906	26 454	129	np
Total	**6 940 292**	**1 531 309**	**950 852**	**2 482 161**	**3 429 597**	**359 548**	**13 211 598**

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

12 EXPENDITURE ON R&D, by sector—by research field: **proportions**

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	%	%	%	%	%	%	%
2004–05							
Mathematical sciences	0.2	1.9	1.0	1.5	2.1	np	np
Physical sciences	0.5	8.1	—	5.0	3.5	—	2.0
Chemical sciences	2.5	6.3	1.4	4.4	4.3	np	np
Earth sciences	1.4	13.2	2.3	9.0	3.0	np	np
Biological sciences	2.3	10.5	14.4	12.0	10.5	19.4	6.6
Information, computing & comm. sciences	26.2	7.9	1.0	5.2	4.8	0.4	16.2
Engineering & technology	57.1	26.0	1.7	16.7	11.1	np	np
Agricultural, veterinary & environ. sciences	2.7	17.9	49.1	29.9	6.8	np	np
Architecture, urban environment & building	0.3	0.2	0.2	0.2	0.8	—	0.4
Medical & health sciences	6.5	3.2	24.5	11.4	25.3	72.3	14.4
Education	0.1	0.1	0.4	0.2	3.5	np	np
Economics	0.1	2.4	1.1	1.9	2.4	np	np
Commerce, management, tourism & services	0.3	0.2	0.3	0.3	4.5	—	1.4
Policy & political science	np	—	—	—	1.8	np	0.5
Studies in human society	—	0.8	0.5	0.7	3.4	0.4	1.0
Behavioural & cognitive sciences	—	0.5	0.1	0.3	3.5	0.3	1.0
Law, justice & law enforcement	np	0.7	1.9	1.2	2.0	—	np
Journalism, librarianship & curatorial studies	np	0.1	0.1	0.1	0.4	—	np
The arts	0.1	—	0.1	—	2.0	—	0.6
Language & culture	—	—	—	—	1.9	—	0.5
History & archaeology	np	0.1	0.1	0.1	1.7	—	np
Philosophy & religion	np	0.1	—	—	0.7	—	np
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
2002–03							
Mathematical sciences	0.4	1.8	0.9	1.5	1.9	np	np
Physical sciences	0.7	7.8	—	4.8	3.8	np	np
Chemical sciences	2.9	6.9	1.8	4.9	4.5	1.1	3.7
Earth sciences	1.7	13.3	4.1	9.8	3.3	—	3.6
Biological sciences	2.7	10.6	10.7	10.6	12.0	29.1	7.3
Information, computing & comm. sciences	27.3	10.8	1.8	7.3	4.2	1.3	16.8
Engineering & technology	54.8	25.7	3.3	17.1	10.9	0.4	34.9
Agricultural, veterinary & environ. sciences	2.8	15.9	54.5	30.7	6.9	0.6	9.0
Architecture, urban environment & building	0.5	0.2	0.1	0.1	0.6	np	np
Medical & health sciences	5.5	1.7	18.1	8.0	25.2	61.4	12.6
Education	—	0.1	0.9	0.4	3.7	np	np
Economics	0.1	3.3	0.8	2.3	2.4	—	1.1
Commerce, management, tourism & services	0.3	0.2	0.4	0.3	4.0	—	1.3
Policy & political science	—	—	0.3	0.1	1.6	0.2	0.4
Studies in human society	—	0.6	0.6	0.6	3.2	0.3	1.0
Behavioural & cognitive sciences	—	0.6	0.2	0.5	3.3	0.3	1.0
Law, justice & law enforcement	np	0.5	0.9	0.6	1.9	np	0.6
Journalism, librarianship & curatorial studies	np	0.1	0.1	0.1	0.4	—	np
The arts	—	—	0.1	—	1.9	—	0.5
Language & culture	np	—	0.1	—	1.9	—	np
History & archaeology	np	0.1	0.4	0.2	1.6	—	np
Philosophy & religion	np	0.1	—	0.1	0.8	—	np
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

13 HUMAN RESOURCES DEVOTED TO R&D, by sector—by type of resource

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	PYE	PYE	PYE	PYE	PYE	PYE	PYE
2004–05							
Researchers(a)	22 899	4 203	4 327	8 530	47 734	2 577	81 739
Technicians(b)	12 868	2 863	2 446	5 309	—	823	19 000
Other staff	5 889	2 270	881	3 150	9 075	530	18 645
Total	**41 656**	**9 335**	**7 654**	**16 989**	**56 809**	**3 930**	**119 384**
2002–03							
Researchers(a)	20 451	3 739	4 297	8 036	42 780	1 906	73 173
Technicians(b)	10 668	4 235	2 863	7 098	—	885	18 651
Other staff	4 819	2 210	1 196	3 407	6 832	325	15 383
Total	**35 939**	**10 185**	**8 357**	**18 541**	**49 612**	**3 117**	**107 209**

— nil or rounded to zero (including null cells)

(a) For the Higher education sector, Researchers include Academics and Postgraduate students.

(b) For the Higher education sector, Technicians are not separately identified and are included in Other staff.

14 HUMAN RESOURCES DEVOTED TO R&D, by sector—by type of resource: **proportions**

		GOVERNMENT					
	BUSINESS	*Commonwealth*	*State/territory*	*Total*	*HIGHER EDUCATION*	*PRIVATE NON-PROFIT*	*TOTAL*
	%	%	%	%	%	%	%
2004–05							
Researchers(a)	55.0	45.0	56.5	50.2	84.0	65.6	68.5
Technicians(b)	30.9	30.7	32.0	31.2	—	20.9	15.9
Other staff	14.1	24.3	11.5	18.5	16.0	13.5	15.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
2002–03							
Researchers(a)	56.9	36.7	51.4	43.3	86.2	61.2	68.3
Technicians(b)	29.7	41.6	34.3	38.3	—	28.4	17.4
Other staff	13.4	21.7	14.3	18.4	13.8	10.4	14.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— nil or rounded to zero (including null cells)

(a) For the Higher education sector, Researchers include Academics and Postgraduate students.

(b) For the Higher education sector, Technicians are not separately identified and are included in Other staff.

EXPLANATORY NOTES

INTRODUCTION

1 The statistics presented in this publication are a summary of expenditure and human resources devoted to R&D performed in Australia by organisations within the Business, Government, Private non-profit and Higher education sectors for the 2004–05 reference period.

2 The data in this publication have been released previously, at more detailed levels, on an individual sector basis (see paragraph 10).

DATA SOURCES

3 Data from each sector were collected separately in the surveys of Research and Experimental Development:

- Business – compiled from data collected from businesses in the Survey of Research and Experimental Development, Businesses in respect of the year ended 30 June 2005. The survey was conducted by mail questionnaire and a 92.6% response was obtained.
- Government and Private non-profit – compiled from data collected from organisations in the Survey of Research and Experimental Development, Government and Private non-profit organisations in respect of the year ended 30 June 2005. The survey was conducted by mail questionnaire and a 96.8% response rate was obtained.
- Higher education – compiled from data collected from universities in the Survey of Research and Experimental Development, Higher Education in respect of the year ended 31 December 2004.

4 GDP and GSP figures used to derive GERD/GDP and GERD/GSP ratios are current at the time of manuscript finalisation and are referenced in the tables below.

EXPENDITURE ON GROSS DOMESTIC PRODUCT, current prices

	1996–97	*1998–99*	*2000–01*	*2002–03*	*2004–05*
	$m	$m	$m	$m	$m
GDP	545 736	607 863	689 340	782 798	893 704

Source: National Income, Expenditure and Product, Australian National Accounts, March Quarter 2006 (cat. no. 5206.0)

GROSS STATE PRODUCT, current prices

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	$m	$m	$m	$m	$m	$m	$m	$m
2002–03	275 358	197 266	132 432	53 635	85 470	13 502	9 042	16 091
2004–05	305 437	222 022	158 506	59 819	100 900	16 114	10 418	18 306

Source: Australian National Accounts, State Accounts (cat. no. 5220.0)

DEFINITIONS

5 R&D as collected by the ABS is defined in accordance with the OECD standard as comprising '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 this stock of knowledge to devise new applications'. Although outside the economic boundary of R&D as defined by the OECD, R&D performed overseas by Australian businesses is included in the data in this publication.

6 For a more comprehensive interpretation of the definition of R&D activity, see the *Australian Standard Research Classification (ASRC), 1998* (cat. no. 1297.0) or refer to the OECD publication *Proposed Standard Practice for Surveys on Research and Experimental Development ('Frascati Manual' 2002)*, OECD, Paris, 2003.

SCOPE

7 The sector classification used in the compilation of these statistics is adapted from the guidelines specified by the OECD for use in the conduct of R&D surveys. There are four distinct sectors:

- Business – includes all businesses whose primary activity is the production of goods or services for sale to the general public at a price intended to cover at least the cost of production, and the private non-profit institutions mainly serving them.
  - The ABS Business R&D survey excludes businesses mainly engaged in Agriculture, forestry and fishing (i.e. industries in Division A of the *Australian and New Zealand Standard Industrial Classification (ANZSIC), 1993* (cat. no. 1292.0).
- Government – includes all Commonwealth, state and local government departments and authorities.
  - The ABS Government R&D survey excludes local government, universities (included in the Higher education sector) and public sector organisations mainly engaged in trading or financial activities (included in the Business sector).
- Higher education – includes all universities and other institutions of post-secondary education whatever their source of finance or legal status.
  - The ABS Higher education R&D survey excludes other higher education institutions, such as colleges of Technical and Further Education colleges.
- Private non-profit – includes private or semi-public incorporated organisations which are established with the intention of not making a profit.

SOCIO-ECONOMIC OBJECTIVE (SEO) AND RESEARCH FIELDS, COURSES AND DISCIPLINES (RFCD) CLASSIFICATIONS

8 Statistics classified by SEO and RFCD have been collected and presented in this publication. Data were subjectively allocated by data providers at the time of reporting, using OECD/ABS definitions. See the Technical note on Reliability of statistics for further detail. For more information on these classifications see the *Australian Standard Research Classification (ASRC), 1998* (cat. no. 1297.0).

LOCATION

9 With the exception of the Higher education sector, all location data represent the region(s) in which the sectors performed the R&D. For the Higher education sector, location represents the main campus or head office state/territory site of the reporting University, with the exception of the Australian Defence Force Academy (ADFA) which is shown against the Australian Capital Territory.

RELATED PUBLICATIONS

10 Users may also wish to refer to the following publications:

Australian Bureau of Statistics 1998, *Australian Standard Research Classification (ASRC)*, cat. no. 1297.0, ABS, Canberra

Australian Bureau of Statistics 2006, *Research and Experimental Development, Businesses, Australia, 2004–05*, cat. no. 8104.0, ABS, Canberra

Australian Bureau of Statistics 2006, *Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2004–05*, cat. no. 8109.0, ABS, Canberra

Australian Bureau of Statistics 2006, *Research and Experimental Development, Higher Education Organisations, Australia, 2004*, cat. no. 8111.0, ABS, Canberra

Organisation for Economic Co-operation and Development 2006, *Main Science and technology Indicators 2006/1*, OECD, Paris

Organisation for Economic Co-operation and Development 2003, *Proposed Standard Practice for Surveys on Research and Experimental Development ('Frascati Manual' 2002)*, OECD, Paris.

RELATED PUBLICATIONS *continued*

11 Current publications and other products released by the ABS are listed in the *Catalogue of Publications and Products* (cat. no. 1101.0). The catalogue is available from any ABS office or the ABS web site <http://www.abs.gov.au>. The ABS also issues a daily Release Advice on the web site which details products to be released in the week ahead.

ABS DATA AVAILABLE ON REQUEST

12 As well as the statistics included in this and related publications, the ABS may have other relevant data available on request. Inquiries should be made to the National Information and Referral Service on 1300 135 070.

ROUNDING

13 Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

NON-SAMPLING ERROR

1 Non-sampling errors may arise as a result of errors in the reporting or processing of data. These errors can be introduced through inadequacies in the questionnaire, treatment of non-response, inaccurate reporting by providers, errors in the application of survey procedures, incorrect recording of answers and errors in data capture and processing.

2 The extent to which non-sampling error affects the results is difficult to measure. Every effort is made to minimise non-sampling error by careful design and testing of the collection instrument, the use of efficient operating procedures and systems, and the use of appropriate methodologies.

Reliability of statistics

3 When interpreting the statistics in this publication, the reliability of the estimates may be affected by the following specific non-sampling errors:

- Many organisations provided estimates due to a lack of separately recorded data on R&D activity.
- Data were subjectively classified, by organisations, to research fields, socio-economic objectives and types of activity at the time of reporting. Some organisations may have experienced difficulty in classifying their R&D projects. The ABS makes every effort to ensure correct and consistent interpretation and reporting of these data by applying consistent processing methodologies.
- Estimation of overhead R&D expenditure varied across organisations.

REVISIONS

4 Revisions to 2002–03 Business sector data were applied for significant changes where there were: errors in previously reported data; and newly identified R&D performers in the previous cycle(s). For more information see the Technical note in *Research and Experimental Development, Businesses, Australia, 2004–05* (cat. no. 8104.0).

5 In 2004–05, revisions were not applied to previous cycle data for the Higher education, Government and Private non-profit sectors. For more information on revisions in these sectors, see the Technical note in the respective sector publications.

GLOSSARY

Applied research	Original work undertaken in order to acquire new knowledge with a specific application in view. It is undertaken either to determine possible uses for the findings of basic research or to determine new methods or ways of achieving some specific and predetermined objectives.
Capital expenditure	Expenditure on the acquisition of fixed tangible assets such as land, buildings, vehicles, plant, machinery and equipment attributable to R&D activity.
Current expenditure	Expenditure on direct labour costs, materials, fuels, rent and hiring, repairs and maintenance, data processing etc. and the proportion of expenditure on general services and overheads which is attributable to R&D activity.
Experimental development	Systematic work, using existing knowledge gained from research or practical experience, for the purpose of creating new or improved products/processes.
Human resources devoted to R&D	The effort of researchers, technicians and other staff directly involved with R&D activity. Overhead staff (e.g. administrative and general service employees such as personnel officers, janitors, etc.) whose work indirectly supports R&D, are excluded.
Labour costs	Wages and salaries, overtime allowances, penalty rates, leave loadings, bonuses, commission payments, all paid leave, employer contributions to superannuation and pension schemes, payroll tax, fringe benefits tax, payments to contract staff on the payroll, severance, termination and redundancy payments and workers' compensation insurance.
Other current expenditure	Expenditure on: materials, fuels and other inputs; rent, leasing and hiring expenses; repair and maintenance expenses; payments to outside organisations for use of specialised testing facilities or for analytical work, engineering or other specialised services in support of R&D projects carried out by the organisation; commission and consultant expenses for research projects carried out by the organisation (except direct labour costs); software for own account produced as part of R&D; and the proportion of expenditure on general services and overheads which is attributable to R&D activity.
Other supporting staff	Skilled and unskilled craftpersons, secretarial and clerical staff directly associated with R&D activity.
Person years of effort	One person year of effort is equal to a full time employee whose time is wholly devoted to R&D for a whole year.
Pure basic research	Experimental and theoretical work undertaken to acquire new knowledge without looking for long-term benefits other than the advancement of knowledge.
R&D activity	The systematic investigation or experimentation involving innovation or technical risk, the outcome of which is new knowledge, with or without a specific practical application, or new or improved products, processes, materials, devices or services. R&D activity extends to modifications to existing products/processes. R&D activity ceases and pre-production begins when work is no longer experimental.
Research field	Field in which the R&D activity was performed. The RFCD classification is primarily structured around disciplines or activities. In short, it describes the nature of the research being performed.
Researchers	Those involved with the conception and/or development of new products/processes (e.g. executives and directors involved in the planning or management of scientific and technical aspects of R&D projects, and software developers/programmers). They exclude executives and directors concerned primarily with budgets and human resources rather than project content.
Socio-economic objective	The broad socio-economic areas of expected benefit rather than the immediate objectives of the researcher. The SEO classification defines the main areas of Australian economic and social activity to which the results of research programs are applied. In short, it describes the purpose of the research.

Strategic basic research Experimental and theoretical work undertaken primarily to acquire new knowledge directed into specified broad areas in the expectation of useful discoveries. It provides the broad base of knowledge for the solution of recognised practical problems.

Technicians Those performing technical tasks in support of R&D activity, normally under the direction and supervision of a researcher. These tasks include preparation of experiments, taking records, preparation of charts and graphs and coding computer programs.

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