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RESEARCH AND EXPERIMENTAL DEVELOPMENT

AUSTRALIA

HIGHER EDUCATION ORGANISATIONS

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CONTENTS

	page
Notes	2
Main features	3

TABLES

1 Expenditure on R&D, by location—by type of expenditure	6
2 Expenditure on R&D, by location—by type of expenditure: proportions	7
3 Expenditure on R&D, by location—by source of funds	8
4 Expenditure on R&D, by location—by source of funds: proportions	9
5 Expenditure on R&D, by location—by type of activity	10
6 Expenditure on R&D, by location—by type of activity: proportions	10
7 Expenditure on R&D, by location—by research field	11
8 Expenditure on R&D, by location—by research field: proportions	12
9 Expenditure on R&D, by location—by socio-economic objective	13
10 Expenditure on R&D, by location—by socio-economic objective: proportions	14
11 Human resources devoted to R&D, by location—by type of resource	15
12 Human resources devoted to R&D, by location—by type of resource: proportions	15

ADDITIONAL INFORMATION

Explanatory notes	16
Technical note	19
Glossary	20

INQUIRIES

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NOTES

CHANGES IN THIS ISSUE Extensive 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 Technical Note.

Data presented in this publication may subsequently be revised.

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ABBREVIATIONS

\$'000 thousand dollars
\$m million dollars
ABS Australian Bureau of Statistics
ACT Australian Capital Territory
Aust. Australia
GDP gross domestic product
GSP gross state product
HERD higher education expenditure on R&D
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
RFCD research fields, courses and disciplines
SA South Australia
SEO socio-economic objective
Tas. Tasmania
Vic. Victoria
WA Western Australia

Dennis Trewin
Australian Statistician

MAIN FEATURES

EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

Higher education expenditure on R&D (HERD) in Australia in 2004 was \$4,283 million. This represented an increase of 24.9% in current price terms over 2002 and 18.0% in chain volume terms.

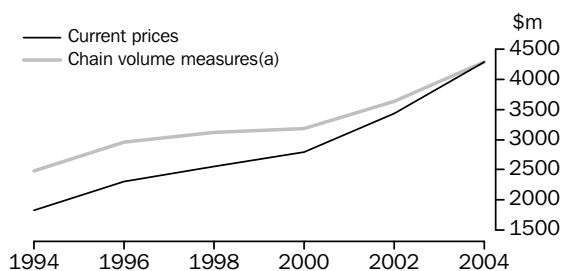
RESOURCES DEVOTED TO R&D

		1994	1996	1998	2000	2002	2004
Expenditure on R&D							
Current prices	\$m	1 830	2 308	2 555	2 790	3 430	4 283
Chain volume measures(a)	\$m	2 480	2 962	3 121	3 179	3 631	4 283
Human resources devoted to R&D	PYE	40 096	42 739	45 502	46 287	49 612	56 809

(a) The reference year for chain volume measures is 2004. See paragraph 14 of the Explanatory Notes for details.

Over the ten years to 2004, HERD increased at an average annual rate of 13.4% in current price terms and 7.3% in chain volume terms.

HIGHER EDUCATION EXPENDITURE ON R&D

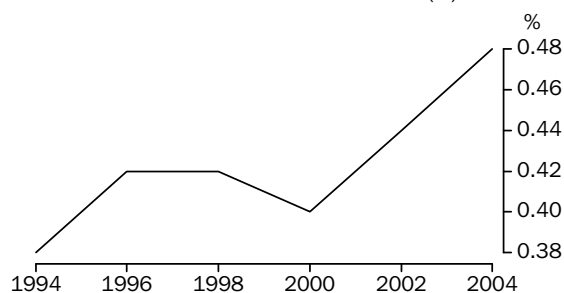


(a) Reference year for chain volume measures is 2004. See paragraph 14 of the Explanatory Notes for details.

Proportion of GDP

HERD as a proportion of gross domestic product (GDP) increased from 0.44% in 2002 to 0.48% in 2004.

HERD AS A PROPORTION OF GDP(a)



(a) See paragraph 2 of the Explanatory Notes for details.

MAIN FEATURES *continued*

Proportion of GDP continued

The following table shows HERD/GDP ratios for selected OECD countries.

HERD/GDP RATIOS OF OECD COUNTRIES

	2000	2001	2002	2003	2004
	%	%	%	%	%
Sweden	na	0.85	na	0.88	na
Canada	0.55	0.59	0.65	0.69	0.73
Finland	0.60	0.61	0.66	0.67	na
Switzerland	0.59	na	0.64	na	na
Iceland	0.45	0.58	0.51	0.63	na
Denmark	0.45	0.45	0.58	0.60	na
Netherlands	0.53	0.51	0.52	na	na
Norway	na	0.41	0.45	0.48	na
Australia	0.40	na	0.44	na	0.48
Japan	0.43	0.44	0.43	0.43	na
Turkey	0.39	0.43	0.43	na	na
Germany	0.39	0.40	0.42	0.43	0.41
France	0.40	0.42	0.42	0.42	0.41
United Kingdom	0.38	0.40	0.42	0.40	na
Belgium	0.41	0.42	0.40	0.40	na
Italy	0.33	0.36	0.38	na	na
United States of America	0.31	0.33	0.36	0.37	0.36
New Zealand	na	0.35	na	0.33	na
Spain	0.27	0.28	0.29	0.32	na
Ireland	0.23	0.24	0.25	0.30	0.33
Portugal	0.30	0.31	0.30	0.30	na
Greece	na	0.29	na	0.30	na
Korea	0.27	0.27	0.26	0.27	na
Hungary	0.19	0.24	0.26	0.26	0.22
Czech Republic	0.18	0.19	0.19	0.19	0.19
Poland	0.21	0.21	0.20	0.18	na
Mexico	0.11	0.12	na	na	na
Slovak Republic	0.06	0.06	0.05	0.08	0.11

na not available

Source: *Main Science and Technology Indicators, 2005/2*, OECD, Paris, 2005

Type of expenditure

In 2004, HERD was comprised of \$4,007.7 million in Current expenditure and \$275.1 million in Capital expenditure. As in 2002, the largest component of HERD in 2004 was Labour costs, which totalled \$1789.2 million (41.8% of HERD).

Source of funds

The majority of HERD in 2004 was sourced from General university funds (\$2,964.6 million or 69.2% of HERD) and Australian competitive research grants (\$739.6 million or 17.3%). These were also the major sources of funds in 2002.

Type of activity

In 2004, 40.8% of HERD (\$1745.6 million) was directed towards Applied research, 28.7% (\$1229.8 million) to Pure basic research, and 22.9% (\$978.8 million) to Strategic basic research. The remaining 7.7% of HERD (\$328.6 million) was comprised of Experimental development. The distribution of HERD across types of activity was largely unchanged from 2002.

Research fields

Almost half (46.9%) of HERD in 2004 was devoted to research in the fields of Medical and health sciences (\$1,082.4 million), Engineering and technology (\$473.9 million) and Biological sciences (\$451.0 million).

MAIN FEATURES *continued*

Socio-economic objectives

More than a quarter (27.9% or \$1,197.0 million) of HERD in 2004 was directed at Health related socio-economic objectives (SEOs). This included the understanding and treatment of clinical diseases and conditions and the provision of public health services.

The next most prevalent SEO was Non-oriented research, which accounted for 20.0% (\$855.3 million) of HERD. This included R&D contributing to the general advancement of knowledge without having a specific application.

There was little change in the distribution of expenditure across SEOs between 2002 and 2004.

State and territory

As in previous years, the majority of HERD (69.1%) in 2004 was located in New South Wales (\$1,192.8 million), Victoria (\$1,052.6) and Queensland (\$715.6 million).

Between 2002 and 2004, New South Wales recorded the largest growth HERD in absolute terms (up \$200.9 million or 20.3%), while Western Australia recorded the fastest rate of growth (up 49.4% or \$146.2 million). All states and territories recorded increases in their expenditure on R&D as a proportion of gross state product (GSP).

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

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
	%	%	%	%	%	%	%	%
2002	0.36	0.44	0.43	0.48	0.35	0.50	0.30	2.18
2004	0.39	0.47	0.45	0.54	0.44	0.52	0.32	2.39

(a) See paragraph 2 of the Explanatory Notes for details.

HUMAN RESOURCES DEVOTED TO R&D

Australian higher education organisations devoted a total of 56,809 person years of effort to R&D in 2004, up 14.5% from 49,612 in 2002. Most of the human resources devoted to R&D in 2004 were Postgraduate students (57.2%) and Academic staff (26.8%), with the remainder being Other staff who directly supported R&D.

As with HERD, New South Wales, Victoria and Queensland accounted for the majority (71.8%) of person years of effort devoted to R&D in 2004.

EXPENDITURE ON R&D, by location—by type of expenditure

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2004									
Capital expenditure									
Land, buildings & other structures	3 635	8 937	37 068	1 216	16 942	315	966	21 924	91 003
Other	50 640	44 737	36 351	15 013	18 318	5 483	1 063	12 455	184 059
<i>Total</i>	<i>54 275</i>	<i>53 674</i>	<i>73 419</i>	<i>16 229</i>	<i>35 259</i>	<i>5 798</i>	<i>2 029</i>	<i>34 379</i>	<i>275 062</i>
Current expenditure									
Labour costs	518 900	430 282	302 008	122 460	181 527	46 825	12 553	174 603	1 789 158
Scholarships	108 942	73 851	48 861	20 943	21 193	8 577	3 188	30 283	315 839
Other	510 699	494 803	291 286	165 751	204 303	22 473	15 252	198 155	1 902 723
<i>Total</i>	<i>1 138 542</i>	<i>998 936</i>	<i>642 155</i>	<i>309 154</i>	<i>407 023</i>	<i>77 874</i>	<i>30 994</i>	<i>403 041</i>	<i>4 007 719</i>
Total	1 192 817	1 052 611	715 574	325 383	442 283	83 672	33 022	437 420	4 282 781
2002									
Capital expenditure									
Land, buildings & other structures	5 893	18 652	87 353	718	5 446	1 199	740	11 217	131 220
Other	47 571	41 220	38 767	10 154	22 090	3 688	1 109	12 098	176 696
<i>Total</i>	<i>53 464</i>	<i>59 872</i>	<i>126 120</i>	<i>10 872</i>	<i>27 535</i>	<i>4 887</i>	<i>1 849</i>	<i>23 315</i>	<i>307 916</i>
Current expenditure									
Labour costs	427 959	359 941	202 193	103 023	140 587	38 210	10 201	154 665	1 436 779
Scholarships	72 236	70 119	36 906	16 954	14 697	7 150	3 439	15 786	237 286
Other	438 225	373 242	209 065	127 107	113 298	17 467	11 840	157 370	1 447 615
<i>Total</i>	<i>938 420</i>	<i>803 302</i>	<i>448 165</i>	<i>247 084</i>	<i>268 582</i>	<i>62 827</i>	<i>25 481</i>	<i>327 821</i>	<i>3 121 681</i>
Total	991 884	863 174	574 285	257 957	296 117	67 714	27 329	351 136	3 429 597

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

	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>ACT</i>	<i>Aust.</i>
	%	%	%	%	%	%	%	%	%
2004									
Capital expenditure									
Land, buildings & other structures	0.3	0.8	5.2	0.4	3.8	0.4	2.9	5.0	2.1
Other	4.2	4.3	5.1	4.6	4.1	6.6	3.2	2.8	4.3
<i>Total</i>	4.6	5.1	10.3	5.0	8.0	6.9	6.1	7.9	6.4
Current expenditure									
Labour costs	43.5	40.9	42.2	37.6	41.0	56.0	38.0	39.9	41.8
Scholarships	9.1	7.0	6.8	6.4	4.8	10.3	9.7	6.9	7.4
Other	42.8	47.0	40.7	50.9	46.2	26.9	46.2	45.3	44.4
<i>Total</i>	95.4	94.9	89.7	95.0	92.0	93.1	93.9	92.1	93.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Capital expenditure									
Land, buildings & other structures	0.6	2.2	15.2	0.3	1.8	1.8	2.7	3.2	3.8
Other	4.8	4.8	6.8	3.9	7.5	5.4	4.1	3.4	5.2
<i>Total</i>	5.4	6.9	22.0	4.2	9.3	7.2	6.8	6.6	9.0
Current expenditure									
Labour costs	43.1	41.7	35.2	39.9	47.5	56.4	37.3	44.0	41.9
Scholarships	7.3	8.1	6.4	6.6	5.0	10.6	12.6	4.5	6.9
Other	44.2	43.2	36.4	49.3	38.3	25.8	43.3	44.8	42.2
<i>Total</i>	94.6	93.1	78.0	95.8	90.7	92.8	93.2	93.4	91.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

EXPENDITURE ON R&D, by location—by source of funds

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2004									
Australian competitive grants									
Commonwealth schemes	188 694	173 887	96 286	62 279	97 284	17 277	4 096	64 894	704 698
Other schemes	8 684	16 742	415	2 893	4 171	542	1 094	397	34 939
Total	197 378	190 629	96 702	65 172	101 455	17 819	5 191	65 292	739 637
General university funds(a)	842 047	689 471	511 917	216 032	270 963	54 257	26 111	353 822	2 964 619
State & local government	24 757	37 950	31 038	16 052	28 421	4 821	1 654	3 432	148 124
Business	65 552	84 926	44 756	16 424	22 445	5 038	25	4 003	243 169
Donations, bequests & foundations	12 837	16 777	14 461	4 897	3 013	1 338	—	863	54 185
Other Australian	262	4 114	2	—	—	36	—	264	4 679
Overseas	49 984	28 744	16 698	6 807	15 986	363	42	9 745	128 368
Total	1 192 817	1 052 611	715 574	325 383	442 283	83 672	33 022	437 420	4 282 781
2002									
Australian competitive grants									
Commonwealth schemes	139 355	137 531	61 280	58 064	58 387	15 646	4 400	32 742	507 405
Other schemes	4 308	5 551	456	501	1 317	97	5	279	12 514
Total	143 663	143 082	61 736	58 565	59 704	15 743	4 405	33 021	519 919
General university funds(a)	716 444	587 346	427 957	158 185	182 193	40 696	21 572	296 094	2 430 488
State & local government	18 117	25 699	17 797	11 019	23 100	6 288	113	2 360	104 494
Business	38 175	65 132	28 089	19 970	11 318	2 950	1 240	7 219	174 093
Donations, bequests & foundations	10 710	17 746	19 373	4 070	939	1 401	—	1 236	55 475
Other Australian	7 284	2 929	5 434	366	13 976	—	—	510	30 499
Overseas	57 491	21 240	13 898	5 782	4 888	636	—	10 695	114 629
Total	991 884	863 174	574 285	257 957	296 117	67 714	27 329	351 136	3 429 597

— nil or rounded to zero (including null cells)

(a) Includes other Commonwealth government funding not covered by the Australian competitive grants scheme.

EXPENDITURE ON R&D, by location—by source of funds: proportions

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
2004									
Australian competitive grants									
Commonwealth schemes	15.8	16.5	13.5	19.1	22.0	20.6	12.4	14.8	16.5
Other schemes	0.7	1.6	0.1	0.9	0.9	0.6	3.3	0.1	0.8
Total	16.5	18.1	13.5	20.0	22.9	21.3	15.7	14.9	17.3
General university funds(a)	70.6	65.5	71.5	66.4	61.3	64.8	79.1	80.9	69.2
State & local government	2.1	3.6	4.3	4.9	6.4	5.8	5.0	0.8	3.5
Business	5.5	8.1	6.3	5.0	5.1	6.0	0.1	0.9	5.7
Donations, bequests & foundations	1.1	1.6	2.0	1.5	0.7	1.6	—	0.2	1.3
Other Australian	—	0.4	—	—	—	—	—	0.1	0.1
Overseas	4.2	2.7	2.3	2.1	3.6	0.4	0.1	2.2	3.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Australian competitive grants									
Commonwealth schemes	14.0	15.9	10.7	22.5	19.7	23.1	16.1	9.3	14.8
Other schemes	0.4	0.6	0.1	0.2	0.4	0.1	—	0.1	0.4
Total	14.5	16.6	10.8	22.7	20.2	23.2	16.1	9.4	15.2
General university funds(a)	72.2	68.0	74.5	61.3	61.5	60.1	78.9	84.3	70.9
State & local government	1.8	3.0	3.1	4.3	7.8	9.3	0.4	0.7	3.0
Business	3.8	7.5	4.9	7.7	3.8	4.4	4.5	2.1	5.1
Donations, bequests & foundations	1.1	2.1	3.4	1.6	0.3	2.1	—	0.4	1.6
Other Australian	0.7	0.3	0.9	0.1	4.7	—	—	0.1	0.9
Overseas	5.8	2.5	2.4	2.2	1.7	0.9	—	3.0	3.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

— nil or rounded to zero (including null cells)

(a) Includes other Commonwealth government funding not covered by the Australian competitive grants scheme.

EXPENDITURE ON R&D, by location—by type of activity

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2004									
Pure basic research	402 982	285 441	130 961	83 204	108 478	18 151	778	199 801	1 229 796
Strategic basic research	235 953	255 164	161 784	73 862	108 684	19 593	1 923	121 846	978 809
Applied research	441 239	445 916	361 374	147 365	181 252	41 713	29 937	96 803	1 745 599
Experimental development	112 643	66 089	61 455	20 952	43 869	4 215	384	18 971	328 578
Total	1 192 817	1 052 611	715 574	325 383	442 283	83 672	33 022	437 420	4 282 781
2002									
Pure basic research	309 484	216 680	141 817	75 829	61 374	12 413	737	156 951	975 286
Strategic basic research	188 446	219 104	141 898	57 049	79 832	18 440	1 905	96 208	802 881
Applied research	410 069	357 189	244 259	103 633	141 793	33 965	24 276	75 522	1 390 706
Experimental development	83 885	70 202	46 312	21 445	13 117	2 897	411	22 455	260 725
Total	991 884	863 174	574 285	257 957	296 117	67 714	27 329	351 136	3 429 597

EXPENDITURE ON R&D, by location—by type of activity: proportions

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
2004									
Pure basic research	33.8	27.1	18.3	25.6	24.5	21.7	2.4	45.7	28.7
Strategic basic research	19.8	24.2	22.6	22.7	24.6	23.4	5.8	27.9	22.9
Applied research	37.0	42.4	50.5	45.3	41.0	49.9	90.7	22.1	40.8
Experimental development	9.4	6.3	8.6	6.4	9.9	5.0	1.2	4.3	7.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Pure basic research	31.2	25.1	24.7	29.4	20.7	18.3	2.7	44.7	28.4
Strategic basic research	19.0	25.4	24.7	22.1	27.0	27.2	7.0	27.4	23.4
Applied research	41.3	41.4	42.5	40.2	47.9	50.2	88.8	21.5	40.6
Experimental development	8.5	8.1	8.1	8.3	4.4	4.3	1.5	6.4	7.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

EXPENDITURE ON R&D, by location—by research field(a)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2004									
Mathematical sciences	36 057	19 847	9 325	5 108	4 016	454	70	14 857	89 734
Physical sciences	40 540	30 897	11 741	5 464	17 530	854	815	42 962	150 803
Chemical sciences	46 612	42 508	36 907	13 968	21 050	2 487	892	21 425	185 850
Earth sciences	22 077	29 024	11 428	7 623	20 273	7 074	141	30 555	128 196
Biological sciences	100 832	77 046	113 946	32 831	60 099	12 382	2 128	51 691	450 955
Info., computing & communication sciences	58 750	60 611	31 527	9 600	22 164	2 969	224	18 198	204 042
Engineering & technology	149 940	120 750	93 003	33 754	50 475	5 501	553	19 893	473 870
Agricultural, veterinary & environ. sciences	71 211	51 245	54 537	33 316	43 670	15 512	10 837	11 518	291 847
Architecture, urban environ. & building	11 353	10 552	2 718	3 728	2 597	1 003	21	419	32 391
Medical & health sciences	300 093	307 521	161 003	116 913	110 341	11 736	3 556	71 279	1 082 442
Education	46 794	37 902	23 713	11 616	18 688	4 888	3 987	2 835	150 423
Economics	21 092	34 385	11 746	2 840	12 692	485	494	19 484	103 218
Commerce, management, tourism & services	56 761	54 537	39 715	11 471	14 024	2 677	2 120	11 659	192 965
Policy & political science	17 459	13 660	8 804	1 595	2 080	1 589	1 019	30 456	76 661
Studies in human society	38 427	36 091	23 414	12 827	7 244	3 565	3 654	19 304	144 525
Behavioural & cognitive sciences	52 050	35 573	27 814	9 310	10 707	1 806	750	10 275	148 285
Law, justice & law enforcement	25 269	22 332	11 851	2 313	4 650	1 907	316	16 319	84 956
Journalism, librarianship & curatorial studies	4 329	3 047	5 302	1 989	750	111	145	1 895	17 567
The arts	31 112	17 512	15 354	1 890	8 161	2 607	425	10 314	87 376
Language & culture	29 456	21 042	12 278	2 482	4 323	1 606	166	11 291	82 643
History & archaeology	19 559	19 971	6 161	3 258	6 138	1 619	684	16 851	74 242
Philosophy & religion	13 043	6 557	3 287	1 487	611	838	24	3 939	29 787
Total	1 192 817	1 052 611	715 574	325 383	442 283	83 672	33 022	437 420	4 282 781
2002									
Mathematical sciences	22 472	17 049	7 457	3 215	2 488	349	—	10 972	64 002
Physical sciences	35 561	24 138	8 117	6 098	9 678	1 009	1 274	43 477	129 350
Chemical sciences	38 902	33 327	34 736	13 574	11 013	2 109	770	20 797	155 227
Earth sciences	24 878	21 640	14 500	6 608	16 325	6 521	95	23 539	114 108
Biological sciences	82 117	69 397	126 938	38 797	30 915	9 642	839	51 509	410 155
Info., computing & communication sciences	38 509	44 413	27 297	6 217	15 298	1 566	363	10 469	144 133
Engineering & technology	119 984	104 915	67 553	18 694	42 087	3 383	2 427	15 503	374 546
Agricultural, veterinary & environ. sciences	58 766	45 351	38 615	24 381	33 788	16 635	10 493	7 161	235 190
Architecture, urban environ. & building	8 834	6 073	2 146	2 092	823	380	82	80	20 509
Medical & health sciences	261 520	276 278	116 188	74 504	74 778	10 781	2 920	46 847	863 816
Education	43 892	32 246	20 314	12 801	11 272	3 251	2 195	2 387	128 357
Economics	20 200	23 747	8 340	2 356	6 900	710	340	21 195	83 788
Commerce, management, tourism & services	46 159	39 801	25 997	7 913	9 019	1 229	1 511	5 597	137 227
Policy & political science	12 338	8 562	5 403	2 456	2 737	990	298	20 745	53 529
Studies in human society	31 308	24 593	19 776	7 512	5 514	1 555	1 261	19 929	111 448
Behavioural & cognitive sciences	41 340	26 820	17 041	11 203	8 259	1 233	490	6 888	113 275
Law, justice & law enforcement	23 231	16 173	8 417	2 607	4 944	1 322	449	8 620	65 764
Journalism, librarianship & curatorial studies	4 871	1 951	2 898	1 321	1 390	34	—	370	12 834
The arts	26 219	13 374	9 856	3 010	2 718	2 051	557	8 471	66 256
Language & culture	23 848	15 638	5 832	5 930	4 247	856	118	7 660	64 129
History & archaeology	15 498	11 936	4 537	4 237	1 658	1 384	758	15 489	55 499
Philosophy & religion	11 436	5 751	2 330	2 427	265	724	90	3 430	26 454
Total	991 884	863 174	574 285	257 957	296 117	67 714	27 329	351 136	3 429 597

— nil or rounded to zero (including null cells)

(a) See paragraph 11 of the Explanatory Notes for details.

EXPENDITURE ON R&D, by location—by research field(a): proportions

	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>ACT</i>	<i>Aust.</i>
	%	%	%	%	%	%	%	%	%
2004									
Mathematical sciences	3.0	1.9	1.3	1.6	0.9	0.5	0.2	3.4	2.1
Physical sciences	3.4	2.9	1.6	1.7	4.0	1.0	2.5	9.8	3.5
Chemical sciences	3.9	4.0	5.2	4.3	4.8	3.0	2.7	4.9	4.3
Earth sciences	1.9	2.8	1.6	2.3	4.6	8.5	0.4	7.0	3.0
Biological sciences	8.5	7.3	15.9	10.1	13.6	14.8	6.4	11.8	10.5
Info., computing & communication sciences	4.9	5.8	4.4	3.0	5.0	3.5	0.7	4.2	4.8
Engineering & technology	12.6	11.5	13.0	10.4	11.4	6.6	1.7	4.5	11.1
Agricultural, veterinary & environ. sciences	6.0	4.9	7.6	10.2	9.9	18.5	32.8	2.6	6.8
Architecture, urban environment & building	1.0	1.0	0.4	1.1	0.6	1.2	0.1	0.1	0.8
Medical & health sciences	25.2	29.2	22.5	35.9	24.9	14.0	10.8	16.3	25.3
Education	3.9	3.6	3.3	3.6	4.2	5.8	12.1	0.6	3.5
Economics	1.8	3.3	1.6	0.9	2.9	0.6	1.5	4.5	2.4
Commerce, management, tourism & services	4.8	5.2	5.6	3.5	3.2	3.2	6.4	2.7	4.5
Policy & political science	1.5	1.3	1.2	0.5	0.5	1.9	3.1	7.0	1.8
Studies in human society	3.2	3.4	3.3	3.9	1.6	4.3	11.1	4.4	3.4
Behavioural & cognitive sciences	4.4	3.4	3.9	2.9	2.4	2.2	2.3	2.3	3.5
Law, justice & law enforcement	2.1	2.1	1.7	0.7	1.1	2.3	1.0	3.7	2.0
Journalism, librarianship & curatorial studies	0.4	0.3	0.7	0.6	0.2	0.1	0.4	0.4	0.4
The arts	2.6	1.7	2.1	0.6	1.8	3.1	1.3	2.4	2.0
Language & culture	2.5	2.0	1.7	0.8	1.0	1.9	0.5	2.6	1.9
History & archaeology	1.6	1.9	0.9	1.0	1.4	1.9	2.1	3.9	1.7
Philosophy & religion	1.1	0.6	0.5	0.5	0.1	1.0	0.1	0.9	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Mathematical sciences	2.3	2.0	1.3	1.2	0.8	0.5	—	3.1	1.9
Physical sciences	3.6	2.8	1.4	2.4	3.3	1.5	4.7	12.4	3.8
Chemical sciences	3.9	3.9	6.0	5.3	3.7	3.1	2.8	5.9	4.5
Earth sciences	2.5	2.5	2.5	2.6	5.5	9.6	0.3	6.7	3.3
Biological sciences	8.3	8.0	22.1	15.0	10.4	14.2	3.1	14.7	12.0
Info., computing & communication sciences	3.9	5.1	4.8	2.4	5.2	2.3	1.3	3.0	4.2
Engineering & technology	12.1	12.2	11.8	7.2	14.2	5.0	8.9	4.4	10.9
Agricultural, veterinary & environ. sciences	5.9	5.3	6.7	9.5	11.4	24.6	38.4	2.0	6.9
Architecture, urban environment & building	0.9	0.7	0.4	0.8	0.3	0.6	0.3	—	0.6
Medical & health sciences	26.4	32.0	20.2	28.9	25.3	15.9	10.7	13.3	25.2
Education	4.4	3.7	3.5	5.0	3.8	4.8	8.0	0.7	3.7
Economics	2.0	2.8	1.5	0.9	2.3	1.0	1.2	6.0	2.4
Commerce, management, tourism & services	4.7	4.6	4.5	3.1	3.0	1.8	5.5	1.6	4.0
Policy & political science	1.2	1.0	0.9	1.0	0.9	1.5	1.1	5.9	1.6
Studies in human society	3.2	2.8	3.4	2.9	1.9	2.3	4.6	5.7	3.2
Behavioural & cognitive sciences	4.2	3.1	3.0	4.3	2.8	1.8	1.8	2.0	3.3
Law, justice & law enforcement	2.3	1.9	1.5	1.0	1.7	2.0	1.6	2.5	1.9
Journalism, librarianship & curatorial studies	0.5	0.2	0.5	0.5	0.5	0.1	—	0.1	0.4
The arts	2.6	1.5	1.7	1.2	0.9	3.0	2.0	2.4	1.9
Language & culture	2.4	1.8	1.0	2.3	1.4	1.3	0.4	2.2	1.9
History & archaeology	1.6	1.4	0.8	1.6	0.6	2.0	2.8	4.4	1.6
Philosophy & religion	1.2	0.7	0.4	0.9	0.1	1.1	0.3	1.0	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

— nil or rounded to zero (including null cells)

(a) See paragraph 11 of the Explanatory Notes for details.

EXPENDITURE ON R&D, by location—by socio-economic objective(a)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2004									
Defence	3 780	7 207	3 170	3 969	496	717	24	9 494	28 857
Economic development									
Plant prod. & plant primary products	37 516	9 767	26 143	21 375	28 001	9 865	257	12 770	145 694
Animal prod. & animal primary products	24 936	20 714	13 351	5 666	15 203	7 101	373	775	88 120
Mineral resources (excl. energy)	7 018	3 328	22 988	7 223	14 222	2 453	—	4 873	62 105
Energy resources	8 199	12 405	2 881	3 005	13 929	94	—	595	41 108
Energy supply	15 500	7 897	3 553	2 736	3 245	1 206	897	5 018	40 052
Manufacturing	89 064	68 992	44 107	22 682	20 118	2 411	201	15 233	262 808
Construction	26 321	21 834	9 320	2 960	5 295	696	—	1 135	67 560
Transport	4 806	9 158	12 536	5 014	1 448	1 587	61	1 064	35 675
Info. & communication services	63 780	60 739	37 684	14 940	11 468	2 107	126	21 683	212 528
Commercial services & tourism	23 567	18 514	14 445	4 170	6 217	843	1 218	2 849	71 821
Economic framework	52 453	69 388	29 129	13 559	19 250	1 920	683	29 631	216 014
Total	353 160	302 737	216 137	103 330	138 397	30 282	3 817	95 626	1 243 485
Society									
Health	323 152	335 133	185 402	111 258	128 933	13 561	3 997	95 559	1 196 995
Education & training	52 002	47 883	25 944	16 851	20 724	5 740	4 355	21 628	195 127
Social develop. & community services	158 254	84 254	71 989	25 086	26 300	11 140	6 093	82 929	466 046
Total	533 408	467 270	283 336	153 194	175 957	30 441	14 445	200 116	1 858 168
Environment									
Environ. policy frameworks & other aspects	13 645	8 930	5 040	1 249	2 041	1 462	166	6 910	39 443
Environmental management	56 549	31 211	54 241	22 477	44 720	12 164	12 891	23 314	257 567
Total	70 193	40 141	59 281	23 726	46 762	13 627	13 057	30 224	297 010
Non-oriented research	232 275	235 257	153 650	41 164	80 671	8 605	1 679	101 959	855 260
Total	1 192 817	1 052 611	715 574	325 383	442 283	83 672	33 022	437 420	4 282 781
2002									
Defence	873	3 527	113	1 154	1 303	69	—	3 904	10 942
Economic development									
Plant prod. & plant primary products	23 747	11 084	19 905	24 358	23 662	6 346	119	6 558	115 779
Animal prod. & animal primary products	23 588	19 366	10 580	3 796	9 017	9 635	283	384	76 649
Mineral resources (excl. energy)	8 100	3 114	20 306	5 220	15 000	2 624	—	4 460	58 824
Energy resources	8 610	11 234	2 525	2 949	9 100	131	—	483	35 032
Energy supply	14 327	7 480	4 724	2 767	2 752	586	3 403	4 528	40 567
Manufacturing	62 434	67 175	31 570	11 010	12 906	1 957	4	13 572	200 628
Construction	24 698	18 379	12 581	2 174	3 019	466	82	733	62 132
Transport	2 884	10 000	9 966	2 395	754	909	28	1 602	28 538
Info. & communication services	43 490	45 682	30 139	10 794	15 285	1 006	584	14 817	161 797
Commercial services & tourism	16 510	12 872	5 944	533	2 684	390	616	3 037	42 586
Economic framework	51 391	52 674	22 972	11 055	10 135	1 632	220	19 233	169 314
Total	279 779	259 060	171 212	77 051	104 316	25 681	5 339	69 407	991 845
Society									
Health	282 282	295 738	134 341	90 918	84 058	11 819	2 449	68 794	970 399
Education & training	50 768	38 397	19 698	18 066	14 940	4 029	2 469	12 474	160 840
Social develop. & community services	121 719	65 010	43 730	22 411	17 039	6 443	4 046	62 587	342 985
Total	454 769	399 145	197 769	131 395	116 037	22 292	8 963	143 855	1 474 224
Environment									
Environ. policy frameworks & other aspects	10 360	6 807	4 284	588	3 291	1 085	305	7 623	34 343
Environmental management	47 492	23 413	39 360	15 568	20 289	10 751	10 747	19 111	186 730
Total	57 852	30 220	43 644	16 156	23 579	11 835	11 053	26 735	221 074
Non-oriented research	198 612	171 222	161 548	32 201	50 881	7 838	1 974	107 236	731 512
Total	991 884	863 174	574 285	257 957	296 117	67 714	27 329	351 136	3 429 597

— nil or rounded to zero (including null cells)

(a) See paragraph 11 of the Explanatory Notes for details.

EXPENDITURE ON R&D, by location—by socio-economic objective(a): proportions

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
2004									
Defence	0.3	0.7	0.4	1.2	0.1	0.9	0.1	2.2	0.7
Economic development									
Plant prod. & plant primary products	3.1	0.9	3.7	6.6	6.3	11.8	0.8	2.9	3.4
Animal prod. & animal primary products	2.1	2.0	1.9	1.7	3.4	8.5	1.1	0.2	2.1
Mineral resources (excl. energy)	0.6	0.3	3.2	2.2	3.2	2.9	—	1.1	1.5
Energy resources	0.7	1.2	0.4	0.9	3.1	0.1	—	0.1	1.0
Energy supply	1.3	0.8	0.5	0.8	0.7	1.4	2.7	1.1	0.9
Manufacturing	7.5	6.6	6.2	7.0	4.5	2.9	0.6	3.5	6.1
Construction	2.2	2.1	1.3	0.9	1.2	0.8	—	0.3	1.6
Transport	0.4	0.9	1.8	1.5	0.3	1.9	0.2	0.2	0.8
Info. & communication services	5.3	5.8	5.3	4.6	2.6	2.5	0.4	5.0	5.0
Commercial services & tourism	2.0	1.8	2.0	1.3	1.4	1.0	3.7	0.7	1.7
Economic framework	4.4	6.6	4.1	4.2	4.4	2.3	2.1	6.8	5.0
Total	29.6	28.8	30.2	31.8	31.3	36.2	11.6	21.9	29.0
Society									
Health	27.1	31.8	25.9	34.2	29.2	16.2	12.1	21.8	27.9
Education & training	4.4	4.5	3.6	5.2	4.7	6.9	13.2	4.9	4.6
Social develop. & community services	13.3	8.0	10.1	7.7	5.9	13.3	18.5	19.0	10.9
Total	44.7	44.4	39.6	47.1	39.8	36.4	43.7	45.7	43.4
Environment									
Environ. policy frameworks & other aspects	1.1	0.8	0.7	0.4	0.5	1.7	0.5	1.6	0.9
Environmental management	4.7	3.0	7.6	6.9	10.1	14.5	39.0	5.3	6.0
Total	5.9	3.8	8.3	7.3	10.6	16.3	39.5	6.9	6.9
Non-oriented research	19.5	22.3	21.5	12.7	18.2	10.3	5.1	23.3	20.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Defence	0.1	0.4	—	0.4	0.4	0.1	—	1.1	0.3
Economic development									
Plant prod. & plant primary products	2.4	1.3	3.5	9.4	8.0	9.4	0.4	1.9	3.4
Animal prod. & animal primary products	2.4	2.2	1.8	1.5	3.0	14.2	1.0	0.1	2.2
Mineral resources (excl. energy)	0.8	0.4	3.5	2.0	5.1	3.9	—	1.3	1.7
Energy resources	0.9	1.3	0.4	1.1	3.1	0.2	—	0.1	1.0
Energy supply	1.4	0.9	0.8	1.1	0.9	0.9	12.5	1.3	1.2
Manufacturing	6.3	7.8	5.5	4.3	4.4	2.9	—	3.9	5.8
Construction	2.5	2.1	2.2	0.8	1.0	0.7	0.3	0.2	1.8
Transport	0.3	1.2	1.7	0.9	0.3	1.3	0.1	0.5	0.8
Info. & communication services	4.4	5.3	5.2	4.2	5.2	1.5	2.1	4.2	4.7
Commercial services & tourism	1.7	1.5	1.0	0.2	0.9	0.6	2.3	0.9	1.2
Economic framework	5.2	6.1	4.0	4.3	3.4	2.4	0.8	5.5	4.9
Total	28.2	30.0	29.8	29.9	35.2	37.9	19.5	19.8	28.9
Society									
Health	28.5	34.3	23.4	35.2	28.4	17.5	9.0	19.6	28.3
Education & training	5.1	4.4	3.4	7.0	5.0	6.0	9.0	3.6	4.7
Social develop. & community services	12.3	7.5	7.6	8.7	5.8	9.5	14.8	17.8	10.0
Total	45.8	46.2	34.4	50.9	39.2	32.9	32.8	41.0	43.0
Environment									
Environ. policy frameworks & other aspects	1.0	0.8	0.7	0.2	1.1	1.6	1.1	2.2	1.0
Environmental management	4.8	2.7	6.9	6.0	6.9	15.9	39.3	5.4	5.4
Total	5.8	3.5	7.6	6.3	8.0	17.5	40.4	7.6	6.4
Non-oriented research	20.0	19.8	28.1	12.5	17.2	11.6	7.2	30.5	21.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

— nil or rounded to zero (including null cells)

(a) See paragraph 11 of the Explanatory Notes for details.

11

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

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	PYE	PYE	PYE	PYE	PYE	PYE	PYE	PYE	PYE
2004									
Academic staff	4 239	4 115	2 415	1 030	1 569	535	177	1 145	15 226
Other staff	2 576	1 492	1 804	484	1 599	123	21	977	9 075
Postgraduate students	10 165	8 660	5 295	2 442	3 317	730	155	1 742	32 508
Total	16 981	14 267	9 514	3 957	6 486	1 389	352	3 864	56 809
2002									
Academic staff	3 662	3 751	1 840	912	1 220	413	91	927	12 817
Other staff	2 288	957	1 129	493	757	98	16	1 094	6 832
Postgraduate students	9 536	7 961	5 083	2 155	3 121	672	130	1 304	29 963
Total	15 487	12 670	8 052	3 561	5 098	1 183	237	3 324	49 612

12

HUMAN RESOURCES DEVOTED TO R&D, by location—by type of resource: proportions

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
2004									
Academic staff	25.0	28.8	25.4	26.0	24.2	38.5	50.1	29.6	26.8
Other staff	15.2	10.5	19.0	12.2	24.7	8.9	5.8	25.3	16.0
Postgraduate students	59.9	60.7	55.7	61.7	51.2	52.6	44.0	45.1	57.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002									
Academic staff	23.6	29.6	22.9	25.6	23.9	34.9	38.5	27.9	25.8
Other staff	14.8	7.6	14.0	13.9	14.8	8.3	6.6	32.9	13.8
Postgraduate students	61.6	62.8	63.1	60.5	61.2	56.8	54.9	39.2	60.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

EXPLANATORY NOTES

DATA SOURCES

1 The statistics presented in this publication have been compiled from data collected from universities in the Survey of Research and Experimental Development in respect of the year ended 31 December 2004.

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

GROSS DOMESTIC PRODUCT

	1994-95	1996-97	1998-99	2000-01	2002-03	2004-05
	\$m	\$m	\$m	\$m	\$m	\$m
GDP	486 578	545 736	607 863	689 340	782 798	893 704

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

GROSS STATE PRODUCT

	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)

3 Financial year GDP and GSP data are used to ensure consistency with ratios published in *Research and Experimental Development, All Sector Summary, Australia* (cat. no. 8112.0).

DEFINITIONS

4 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'.

5 Types of R&D activity comprise pure basic research, strategic basic research, applied research and experimental development. See the Glossary for further details. Data in this classification are subjectively allocated by data providers at the time of reporting, using OECD/ABS definitions. The ABS makes every effort to ensure correct and consistent interpretation and reporting of these data and applies consistent processing methodologies. Analysts using these data should bear the original subjectivity in mind.

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 AND COVERAGE

7 The OECD definition of the higher education sector encompasses universities and other institutions of post-secondary education regardless of their source of finance or legal status.

8 The ABS R&D survey of the higher education sector covers Australian universities but excludes other higher education institutions, such as colleges of Technical and Further Education. All research performed by universities in the reference period irrespective of the source of funds is in scope, including research performed:

- as a participant in unincorporated Cooperative Research Centres (CRCs); and
- on contract for other legal entities (such as private business or incorporated CRCs).

EXPLANATORY NOTES *continued*

SCOPE AND COVERAGE

continued

9 R&D performed on a university campus by other legal entities or their employees is excluded from the survey. For example, R&D performed by incorporated CRCs, university controlled entities or employees of other organisations. The R&D performed by these entities and their employees will be in scope of the relevant R&D sector (Business, Government or Private non-profit).

LOCATION OF R&D

10 Data shown in this publication represent the main campus or head office location of the reporting University, with the exception of the Australian Defence Force Academy (ADFA) which is shown against the Australian Capital Territory.

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

11 Statistics classified by SEO and RFCD have been collected and presented in this publication. Data are subjectively allocated by universities at the time of reporting. 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).

DERIVED DATA

12 In compiling their R&D statistics, universities were asked to provide data on:

- direct staff inputs (i.e. staff directly performing R&D);
- direct expenditure (i.e. expenses directly attributable to R&D); and
- other staff and resources supporting, but not directly performing, R&D.

13 To obtain the total cost of the R&D undertaken, indirect (overhead) expenditure needs to be added to direct expenditure on R&D. As some universities included an estimate of overheads in reported data, no further estimation was required. In cases where data did not include overheads, an estimate was calculated by either:

- the university identifying the value of R&D related overhead costs to be apportioned across relevant projects/schools; or
- the ABS, using a methodology agreed to by the universities and the Australian Vice-Chancellors' Committee. For more information contact the ABS.

CHAIN VOLUME MEASURES

14 The chain volume measures appearing in this publication are annually reweighted chain Laspeyres indexes referenced to the current price values in a chosen reference year (currently 2004). They can be thought of as current price values re-expressed in (i.e. based on) the prices of the previous year and linked together to form continuous time series. They are formed in a multi-stage process of which the major steps are described in Section 15 of the information paper *Introduction of Chain Volume Measures in the Australian National Accounts* (cat. no. 5248.0).

RELATED PUBLICATIONS

15 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 2004, *Research and Experimental Development, All Sector Summary, Australia, 2002–03*, cat. no. 8112.0, ABS, Canberra

Australian Bureau of Statistics 2005, *Research and Experimental Development, Businesses, Australia, 2003–04*, cat. no. 8104.0, ABS, Canberra

Australian Bureau of Statistics 2004, *Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2002–03*, cat. no. 8109.0, ABS, Canberra

Organisation for Economic Co-operation and Development 2005, *Main Science and Technology Indicators 2005/2*, 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.

EXPLANATORY NOTES *continued*

RELATED PUBLICATIONS

continued

16 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

17 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

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

TECHNICAL NOTE DATA QUALITY

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 collection instrument, 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 universities provided estimates due to a lack of separately recorded data on R&D activity.
- Data were subjectively classified, by universities, to Research fields, Socio-economic objectives and Type of activity at the time of reporting. Some universities 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 universities.

GLOSSARY

Applied research	Original work undertaken primarily 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, scholarships, 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	Expenditure relating to: wages and salaries; overtime earnings; penalty payments; shift allowances; employer contributions into superannuation; fringe benefits and payroll taxes; severance, termination and redundancy payments; workers' compensation premiums/costs; provisions for employee entitlements; salaries and fees of directors and executives; retainers and commissions of persons who received a retainer; bonuses; annual and other types of paid leave.
Other staff	Technicians, skilled/unskilled craftpersons, secretarial and clerical staff directly involved in 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	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	Reflects the field of research in which the R&D activity was performed. The RFCD classification is primarily structured around disciplines or activities. It describes the nature of the R&D which is being examined.
Scholarships	Comprises expenditure by the university on scholarships for research higher degrees.
Socio-economic objective	Reflects the purpose of the R&D as perceived by the data provider. The SEO classification consists of discrete economic, social, technological or scientific domains for identifying the principal purpose of the R&D.
Strategic basic research	Experimental and theoretical work undertaken 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.
Type of R&D activity	This classification allows R&D activity to be categorised according to the type of research effort, namely, pure basic research, strategic basic research, applied research and experimental development.

FOR MORE INFORMATION . . .

<i>INTERNET</i>	www.abs.gov.au the ABS web site is the best place for data from our publications and information about the ABS.
<i>LIBRARY</i>	A range of ABS publications are available from public and tertiary libraries Australia wide. Contact your nearest library to determine whether it has the ABS statistics you require, or visit our web site for a list of libraries.

INFORMATION AND REFERRAL SERVICE

Our consultants can help you access the full range of information published by the ABS that is available free of charge from our web site, or purchase a hard copy publication. Information tailored to your needs can also be requested as a 'user pays' service. Specialists are on hand to help you with analytical or methodological advice.

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