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RESEARCH AND EXPERIMENTAL DEVELOPMENT, BUSINESSES AUSTRALIA

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C O N T E N T S

	<i>page</i>
Notes	2
Abbreviations	3
Main Features	4
Business expenditure on R&D (BERD)	6
Business human resources devoted to R&D	9
List of Tables	11
Explanatory Notes	31
Technical Note	35
Glossary	36

I N Q U I R I E S

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

INTRODUCTION

This release presents summary statistics on Research and Experimental Development (R&D) undertaken by Australian businesses. Data used in the compilation of these statistics were provided to the ABS by businesses in respect of the financial year ended 30 June 2008.

Users should refer to the Explanatory and Technical Notes for further contextual information when interpreting these results.

ADDITIONAL DATA

In addition to the tables presented in this release, more detailed data (including time series data) are available in spreadsheet format (data cubes) on the ABS website <www.abs.gov.au>. See the Downloads page for this issue (cat. no. 8104.0).

CHANGES IN THIS ISSUE

For the first time, field of research and socio-economic objective data presented in this issue have been collected and compiled based on the *Australian and New Zealand Standard Research Classification (ANZSRC), 2008* (cat.no. 1297.0). Previous releases of this issue used the Australian Standard Research Classification (ASRC).

Previous cycle estimates have not been recompiled using the new classification. As such, field of research and socio-economic objective tables included in this release present current cycle data only and on an ANZSRC basis. However, previous cycle data are available in the data cubes on an ASRC basis.

DATA QUALITY

When interpreting the results in this release 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 in the Technical Note.

This release includes revised data for the 2005–06 and 2006–07 reference periods. Refer to the Revisions section of the Technical Note for further detail.

Brian Pink
Australian Statistician

ABBREVIATIONS

\$'000	thousand dollars
\$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZSIC	Australian and New Zealand Standard Industrial Classification
ANZSIC06	<i>Australian and New Zealand Standard Industrial Classification, 2006 Edition</i>
ANZSRC	Australian and New Zealand Standard Research Classification
ASRC	Australian Standard Research Classification
ATO	Australian Taxation Office
BERD	business expenditure on R&D
FOR	Fields of Research
GDP	gross domestic product
GSP	gross state product
n.e.c.	not elsewhere classified
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
SEO	socio-economic objective
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia

MAIN FEATURES

BUSINESS RESOURCES DEVOTED TO RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

Business expenditure on R&D (BERD) in Australia during 2007–08 was \$14,380 million. BERD increased by 15% in current price terms and 9% in chain volume terms from 2006–07. (See Explanatory Notes 22 and 23 for information regarding the interpretation of chain volume measures.)

Business human resources devoted to R&D in 2007–08 totalled 49,114 person years of effort (PYE), an increase of 6% from 2006–07.

BUSINESS RESOURCES DEVOTED TO R&D

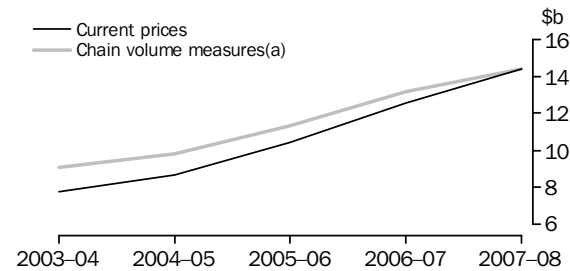
		2003–04	2004–05	2005–06	2006–07	2007–08
Expenditure on R&D						
Current prices	\$m	7 770	8 676	r10 434	r12 549	14 380
Chain volume measures(a)	\$m	9 087	9 810	11 339	13 175	14 380
Human resources devoted to R&D	PYE	37 430	40 458	r43 686	r46 327	49 114

r revised

(a) The reference year for chain volume measures is 2007–08. See Explanatory Notes 22 and 23 for details.

Over the five years to 2007–08, BERD increased at an average annual rate of 17% in current price terms and 12% in chain volume terms.

BUSINESS EXPENDITURE ON R&D



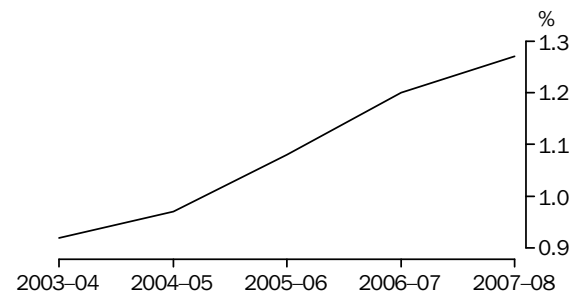
(a) Reference year for chain volume measures is 2007–08. See Explanatory Notes 22 and 23 for details.

Subsequent expenditure figures and supporting commentary relate to current price terms.

BERD and gross domestic product (GDP)

BERD as a proportion of GDP increased between 2006–07 and 2007–08, moving from 1.20% to 1.27%.

BERD, as a proportion of GDP(a)



(a) See Explanatory Note 2 for details.

MAIN FEATURES *continued*

BERD and gross domestic product (GDP) continued

The following table shows BERD/GDP ratios for Organisation for Economic Co-operation and Development (OECD) countries. Although Australia's BERD/GDP ratio for 2007–08 remained below the OECD average of 1.59%, its growth from 2006–07 was greater than the OECD average growth.

BERD/GDP RATIOS OF OECD COUNTRIES (a)(b)

	2003–04	2004–05	2005–06	2006–07	2007–08
	%	%	%	%	%
Japan	2.40	2.38	2.54	2.63	2.68
Sweden	2.86	2.66	2.62	2.79	2.66
Korea	2.00	2.18	2.29	2.49	2.65
Finland	2.42	2.42	2.47	2.46	2.51
Switzerland	na	2.14	na	na	na
United States of America	1.84	1.79	1.83	1.89	1.93
Austria	na	1.53	1.70	1.73	1.81
Germany	1.76	1.74	1.72	1.77	1.78
Denmark	1.78	1.69	1.68	1.66	1.66
Iceland	1.46	na	1.43	1.59	1.50
Luxembourg	1.47	1.43	1.35	1.43	1.36
France	1.36	1.36	1.30	1.32	1.31
Belgium	1.31	1.29	1.25	1.30	1.30
Australia(c)	0.92	0.97	1.08	1.20	1.27
United Kingdom	1.11	1.06	1.06	1.08	1.15
Canada	1.16	1.18	1.15	1.11	1.05
Netherlands	1.01	1.03	1.01	1.02	1.03
Czech Republic	0.76	0.79	0.91	1.03	0.98
Ireland	0.79	0.81	0.82	0.88	0.88
Norway	0.98	0.87	0.82	0.82	0.88
Spain	0.57	0.58	0.60	0.67	0.71
Portugal	0.24	0.28	0.31	0.47	0.61
Italy	0.52	0.52	0.55	0.55	0.55
New Zealand	0.48	na	0.48	na	0.51
Hungary	0.34	0.36	0.41	0.48	0.49
Turkey	0.11	0.12	0.20	0.22	0.29
Mexico	0.14	0.20	0.23	na	na
Slovak Republic	0.32	0.25	0.25	0.21	0.18
Poland	0.15	0.16	0.18	0.18	0.17
Greece	0.18	0.17	0.18	0.17	0.16
Total OECD	1.50	1.48	1.51	1.56	1.59

na not available

(a) Ranked by 2007–08 BERD/GDP ratio.

(b) BERD/GDP ratios for some countries are projected or estimated as per the OECD source table.

(c) The Australian ratios appearing in this table may differ from those published in *Main Science and Technology Indicators, 2009/1*, OECD due to inclusion of more recently available and revised data.

Source: *Main Science and Technology Indicators, 2009/1*, OECD

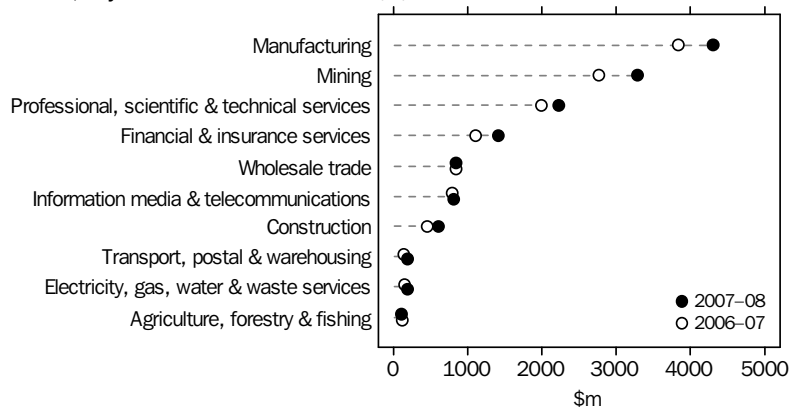
BUSINESS EXPENDITURE ON R&D (BERD)

INDUSTRY

In 2007–08, the largest contributors to BERD were Manufacturing (\$4,305 million or 30%), Mining (\$3,283 million or 23%) and Professional, scientific and technical services (\$2,230 million or 16%).

Of all industries, Mining and Manufacturing reported the largest absolute growth from 2006–07, increasing their expenditure on R&D by \$510 million (18%) and \$469 million (12%) respectively. Other industries to record large increases included Financial and insurance services (up \$313 million or 28%) and Professional, scientific and technical services (up \$233 million or 12%).

BERD, by selected industries(a)



(a) Ranked by 2007–08 BERD.

EMPLOYMENT SIZE

In 2007–08, businesses with 200 or more employees made the largest contribution to BERD (\$10,040 million or 70%), followed by those with 20–199 employees (\$2,753 million or 19%). Making the smallest contribution to BERD were businesses with 0–4 employees (\$477 million or 3%) and those with 5–19 employees (\$1,109 million or 8%). Businesses with 200 or more employees contributed 71% (\$1,302 million) of the total growth in BERD between 2006–07 and 2007–08.

TYPE OF EXPENDITURE

As in previous years, BERD in 2007–08 was mainly comprised of Current expenditure (\$13,620 million or 95% of BERD). Current expenditure was in turn comprised of \$8,690 million in Labour costs and \$4,929 million in Other current expenditure. Capital expenditure in 2007–08 totalled \$760 million.

The industries with the highest level of Labour costs as a proportion of its BERD were Retail trade and Education and training (both at 60%), while the lowest were reported in Mining and Electricity, gas, water and waste services (at 14% and 18% respectively).

Manufacturing (\$272 million) and Mining (\$155 million) combined made up more than half (56%) of total Capital expenditure.

SOURCE OF FUNDS

The Business sector was the main source of BERD funds in 2007–08, with \$13,389 million (93%) coming from Own funds and \$350 million (2%) from Other business. Commonwealth government and Overseas sources were the next largest funders of BERD, at \$390 million (3%) and \$192 million (1%) respectively.

BUSINESS EXPENDITURE ON R&D (BERD) *continued*

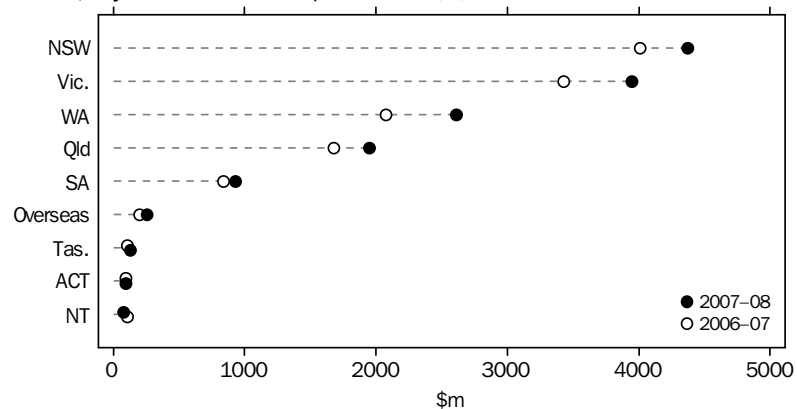
SOURCE OF FUNDS *continued*

Health care and social assistance and Professional, scientific and technical services industries had the lowest proportions of self-funded research, at 71% and 80% respectively.

LOCATION OF EXPENDITURE

Locations in New South Wales and Victoria continued to record the highest levels of BERD in 2007–08, at \$4,371 million (30%) and \$3,949 million (28%) respectively. Western Australia reported the largest absolute growth in BERD (up \$532 million) from 2006–07, followed by Victoria (up \$521 million) and New South Wales (up \$361 million).

BERD, by location of expenditure(a)



(a) Ranked by 2007–08 BERD.

While Manufacturing accounted for the largest proportion of BERD in a majority of locations, in 2007–08 the dominant industry in Western Australia was Mining (making up 61% of WA BERD).

Western Australia (1.66%) and Victoria (1.47%) reported the highest percentages of BERD as a proportion of Gross State Product (GSP). Western Australia also experienced the largest increase in its BERD/GSP ratio from 2006–07, rising from 1.49% to 1.66%.

BERD, by location of expenditure—proportion of GSP(a)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
	%	%	%	%	%	%	%	%
2005–06	1.08	1.27	0.74	1.00	1.35	0.45	0.82	0.50
2006–07	1.19	1.38	0.85	1.23	1.49	0.52	0.78	0.43
2007–08	1.21	1.47	0.91	1.27	1.66	0.62	0.52	0.43

(a) See Explanatory Note 2 for details.

TYPE OF ACTIVITY

In 2007–08, the majority of BERD was directed into Experimental development (\$8,966 million or 62%) and Applied research (\$4,615 million or 32%). Experimental development showed the largest absolute growth between 2006–07 and 2007–08, increasing by \$1,234 million.

FIELD OF RESEARCH

Accounting for 81% of BERD in 2007–08 were the research fields of Engineering (\$7,921 million or 55%) and Information and computing sciences (\$3,678 million or 26%).

BUSINESS EXPENDITURE ON R&D (BERD) *continued*

SOCIO-ECONOMIC OBJECTIVE (SEO)

BERD on SEO Manufacturing (\$4,522 million) was more than double that of any other SEO and accounted for 31% of BERD in 2007–08. Mineral resources (excluding energy resources) and Energy SEOs reported the next highest levels of BERD, at \$2,057 million and \$2,021 million respectively.

FOREIGN OWNERSHIP

Wholly Australian owned businesses made the largest contribution to BERD at \$6,353 million, however businesses with Greater than 50% foreign ownership reported the largest absolute growth from 2006–07, up \$629 million.

BERD, by level of foreign ownership(a)

	2006–07	2007–08
	\$'000	\$'000
Wholly Australian owned (0%)	5 756 655	6 353 105
Greater than 0% and less than 10%	704 332	747 608
10% to 50%	1 505 686	2 067 485
Greater than 50%	4 582 209	5 211 698
Total	12 548 882	14 379 896

(a) A definition of foreign ownership was not provided to survey respondents and data were accepted as reported.

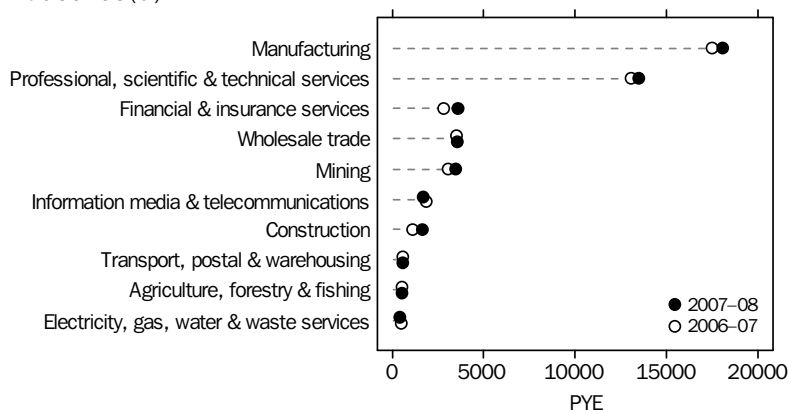
BUSINESS HUMAN RESOURCES DEVOTED TO R&D

INDUSTRY

In 2007–08, Manufacturing and Professional, scientific and technical services were the main contributors to total human resources devoted to R&D, at 37% and 27% respectively.

Financial and insurance services recorded the largest increase in human resources devoted to R&D from 2006–07, up 792 person years of effort (PYE), followed by Manufacturing and Construction (up 553 PYE and 550 PYE respectively).

BUSINESS HUMAN RESOURCES DEVOTED TO R&D, by selected industries(a)



(a) Ranked by 2007–08 total human resources devoted to R&D.

EMPLOYMENT SIZE

Businesses with 200 or more employees accounted for 27,700 PYE (56%) of total human resources devoted to R&D in 2007–08, while those with 0–4 employees contributed 1,436 PYE (3%). Businesses with 5–19 employees and 0–4 employees recorded the largest growth in PYE from 2006–07, at 9% and 8% respectively.

TYPE OF RESOURCE

Researchers continued to be the main type of human resource devoted to R&D (52% of total PYE) in 2007–08. Technicians reported the largest absolute growth from 2006–07 (up 1,098 PYE).

FOREIGN OWNERSHIP

In 2007–08, as for business expenditure on R&D, wholly Australian owned businesses made the largest contribution to human resource effort at 25,587 PYE, while businesses with Greater than 50% foreign ownership contributed the largest increase in human resource effort devoted to R&D (up 1,639 PYE) from 2006–07.

BUSINESS HUMAN RESOURCES DEVOTED TO R&D, by level of foreign ownership(a)

	2006–07	2007–08
	PYE	PYE
Wholly Australian owned (0%)	23 950	25 587
Greater than 0% and less than 10%	2 472	2 577
10% to 50%	4 843	4 249
Greater than 50%	15 062	16 701
Total	46 327	49 114

(a) A definition of foreign ownership was not provided to survey respondents and data were accepted as reported.

LIST OF TABLES

page

BUSINESS EXPENDITURE ON R&D

1	Expenditure on R&D, summary statistics – 2005–06 to 2007–08	12
2	Expenditure on R&D, by industry – values and proportions – 2005–06 to 2007–08	13
3	Expenditure on R&D, by industry – by employment size – 2006–07 and 2007–08	14
4	Expenditure on R&D, by industry – by employment size: proportions – 2006–07 and 2007–08	15
5	Expenditure on R&D, by industry – by type of expenditure – 2006–07 and 2007–08	16
6	Expenditure on R&D, by industry – by type of expenditure: proportions – 2006–07 and 2007–08	17
7	Expenditure on R&D, by industry – by source of funds – 2006–07 and 2007–08	18
8	Expenditure on R&D, by industry – by source of funds: proportions – 2006–07 and 2007–08	19
9	Expenditure on R&D, by industry – by location of expenditure – 2006–07 and 2007–08	20
10	Expenditure on R&D, by industry – by location of expenditure: proportions – 2006–07 and 2007–08	21
11	Expenditure on R&D, by industry – by type of activity – 2006–07 and 2007–08	22
12	Expenditure on R&D, by industry – by type of activity: proportions – 2006–07 and 2007–08	23
13	Expenditure on R&D, by field of research – values and proportions: 2007–08	24
14	Expenditure on R&D, by socio-economic objective – values and proportions: 2007–08	25

BUSINESS HUMAN RESOURCES DEVOTED TO R&D

15	Human resources devoted to R&D, summary statistics – 2005–06 to 2007–08	26
16	Human resources devoted to R&D, by industry – values and proportions: 2005–06 to 2007–08	26
17	Human resources devoted to R&D, by industry – by employment size – 2006–07 and 2007–08	27
18	Human resources devoted to R&D, by industry – by employment size: proportions – 2006–07 and 2007–08	28
19	Human resources devoted to R&D, by industry – by type of resource – 2006–07 and 2007–08	29
20	Human resources devoted to R&D, by industry – by type of resource: proportions – 2006–07 and 2007–08	30

BUSINESS EXPENDITURE ON R&D(a), summary statistics—2005–06 to 2007–08

	EXPENDITURE ON R&D			PROPORTION OF TOTAL EXPENDITURE ON R&D		
	2005–06	2006–07	2007–08	2005–06	2006–07	2007–08
	\$'000	\$'000	\$'000	%	%	%
Employment size						
0–4 persons	360 263	412 272	477 409	3.5	3.3	3.3
5–19 persons	996 279	1 061 014	1 109 071	9.5	8.5	7.7
20–199 persons	2 145 819	2 337 091	2 753 047	20.6	18.6	19.1
200 or more persons	6 931 880	8 738 505	10 040 369	66.4	69.6	69.8
Type of expenditure						
Capital expenditure						
Land, buildings & other structures	107 162	101 386	132 380	1.0	0.8	0.9
Other capital expenditure	575 001	674 080	627 568	5.5	5.4	4.4
<i>Total</i>	682 163	775 466	759 948	6.5	6.2	5.3
Current expenditure						
Labour costs	3 922 717	4 332 528	4 929 508	37.6	34.5	34.3
Other current expenditure	5 829 361	7 440 888	8 690 440	55.9	59.3	60.4
<i>Total</i>	9 752 078	11 773 416	13 619 948	93.5	93.8	94.7
Source of funds						
Own funds	9 568 397	11 491 781	13 389 456	91.7	91.6	93.1
Other business	222 840	292 586	349 706	2.1	2.3	2.4
Commonwealth government	388 245	416 148	389 938	3.7	3.3	2.7
State and local government	31 860	71 511	39 222	0.3	0.6	0.3
Other Australian(b)	53 082	35 468	19 994	0.5	0.3	0.1
Overseas	169 818	241 388	191 580	1.6	1.9	1.3
Location of expenditure						
New South Wales	3 416 269	4 010 428	4 371 105	32.7	32.0	30.4
Victoria	2 996 976	3 427 666	3 949 045	28.7	27.3	27.5
Queensland	1 345 704	1 681 937	1 949 795	12.9	13.4	13.6
South Australia	644 244	841 051	929 402	6.2	6.7	6.5
Western Australia	1 600 342	2 077 181	2 608 998	15.3	16.6	18.1
Tasmania	82 517	105 078	131 932	0.8	0.8	0.9
Northern Territory	101 566	108 760	80 702	1.0	0.9	0.6
Australian Capital Territory	99 214	94 020	99 934	1.0	0.7	0.7
Overseas	147 409	202 761	258 985	1.4	1.6	1.8
Type of activity						
Pure basic research	67 514	73 442	74 263	0.6	0.6	0.5
Strategic basic research	424 182	651 895	724 061	4.1	5.2	5.0
Applied research	3 473 096	4 091 792	4 615 386	33.3	32.6	32.1
Experimental development	6 469 450	7 731 753	8 966 187	62.0	61.6	62.4
Total expenditure on R&D	10 434 241	12 548 882	14 379 896	100.0	100.0	100.0

(a) 2005–06 and 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

(b) Includes funding from Joint business/government, Higher education and Private non-profit organisations.

	EXPENDITURE ON R&D			PROPORTION OF TOTAL EXPENDITURE ON R&D		
	2005–06	2006–07	2007–08	2005–06	2006–07	2007–08
	\$'000	\$'000	\$'000	%	%	%
Agriculture, forestry & fishing	99 545	124 132	113 909	1.0	1.0	0.8
Mining	1 806 093	2 772 885	3 282 546	17.3	22.1	22.8
Manufacturing	3 724 921	3 835 696	4 304 892	35.7	30.6	29.9
Electricity, gas, water & waste services	113 887	148 976	189 684	1.1	1.2	1.3
Construction	401 898	456 025	614 874	3.9	3.6	4.3
Wholesale trade	685 417	844 235	841 541	6.6	6.7	5.9
Retail trade	51 838	93 486	65 338	0.5	0.7	0.5
Accommodation & food services	np	np	17 132	np	np	0.1
Transport, postal & warehousing	127 124	138 529	192 003	1.2	1.1	1.3
Information media & telecommunications	445 954	797 693	814 501	4.3	6.4	5.7
Financial & insurance services	951 164	1 104 400	1 416 948	9.1	8.8	9.9
Rental, hiring & real estate services	17 677	39 722	69 442	0.2	0.3	0.5
Professional, scientific & technical services	1 826 870	1 997 051	2 230 452	17.5	15.9	15.5
Administrative & support services	59 537	70 301	75 830	0.6	0.6	0.5
Public administration & safety	9 523	np	5 328	0.1	np	—
Education & training	np	7 780	5 205	np	0.1	—
Health care & social assistance	40 654	42 046	56 706	0.4	0.3	0.4
Arts & recreation services	16 730	12 181	26 661	0.2	0.1	0.2
Other services	41 313	44 687	56 904	0.4	0.4	0.4
Total	10 434 241	12 548 882	14 379 896	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) 2005–06 and 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

BUSINESS EXPENDITURE ON R&D, by industry—by employment size—2006–07 and 2007–08

	0–4 persons	5–19 persons	20–199 persons	200 or more persons	Total expenditure on R&D
	\$'000	\$'000	\$'000	\$'000	\$'000
2007–08					
Agriculture, forestry & fishing	7 611	18 530	50 874	36 894	113 909
Mining	89 204	132 497	482 427	2 578 418	3 282 546
Manufacturing	107 986	200 011	803 828	3 193 067	4 304 892
Electricity, gas, water & waste services	7 551	6 248	35 460	140 425	189 684
Construction	4 828	24 281	62 160	523 605	614 874
Wholesale trade	14 837	63 624	146 375	616 705	841 541
Retail trade	4 727	13 266	18 103	29 242	65 338
Accommodation & food services	np	—	np	np	17 132
Transport, postal & warehousing	2 287	6 086	10 912	172 718	192 003
Information media & telecommunications	8 548	22 618	51 121	732 214	814 501
Financial & insurance services	19 384	19 395	48 111	1 330 058	1 416 948
Rental, hiring & real estate services	13 827	np	10 762	np	69 442
Professional, scientific & technical services	181 984	546 659	954 291	547 518	2 230 452
Administrative & support services	2 664	11 151	16 006	46 009	75 830
Public administration & safety	np	np	np	np	5 328
Education & training	1 827	1 656	1 722	—	5 205
Health care & social assistance	3 925	15 040	20 403	17 338	56 706
Arts & recreation services	np	np	14 328	np	26 661
Other services	np	15 767	22 482	np	56 904
Total	477 409	1 109 071	2 753 047	10 040 369	14 379 896

2006–07 (a)					
Agriculture, forestry & fishing	13 730	22 702	46 086	41 614	124 132
Mining	56 725	210 139	335 167	2 170 854	2 772 885
Manufacturing	107 424	166 700	721 136	2 840 436	3 835 696
Electricity, gas, water & waste services	4 376	8 817	12 984	122 799	148 976
Construction	5 162	24 855	77 537	348 471	456 025
Wholesale trade	14 439	50 434	122 116	657 246	844 235
Retail trade	3 067	12 951	16 709	60 759	93 486
Accommodation & food services	np	—	np	np	np
Transport, postal & warehousing	2 116	5 300	15 511	115 602	138 529
Information media & telecommunications	11 105	17 023	59 502	710 063	797 693
Financial & insurance services	13 087	15 558	49 165	1 026 590	1 104 400
Rental, hiring & real estate services	6 541	8 291	7 584	17 306	39 722
Professional, scientific & technical services	162 097	482 208	827 050	525 696	1 997 051
Administrative & support services	1 807	5 691	10 603	52 200	70 301
Public administration & safety	np	np	1 012	np	np
Education & training	np	2 321	np	—	7 780
Health care & social assistance	2 097	12 461	12 609	14 879	42 046
Arts & recreation services	831	np	np	np	12 181
Other services	np	13 307	14 796	np	44 687
Total	412 272	1 061 014	2 337 091	8 738 505	12 548 882

— nil or rounded to zero (including null cells)

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

BUSINESS EXPENDITURE ON R&D, by industry—by employment size: **proportions**—
2006–07 and 2007–08

	0–4 persons	5–19 persons	20–199 persons	200 or more persons	Total expenditure on R&D
	%	%	%	%	%
2007–08					
Agriculture, forestry & fishing	6.7	16.3	44.7	32.4	100.0
Mining	2.7	4.0	14.7	78.5	100.0
Manufacturing	2.5	4.6	18.7	74.2	100.0
Electricity, gas, water & waste services	4.0	3.3	18.7	74.0	100.0
Construction	0.8	3.9	10.1	85.2	100.0
Wholesale trade	1.8	7.6	17.4	73.3	100.0
Retail trade	7.2	20.3	27.7	44.8	100.0
Accommodation & food services	np	—	np	np	100.0
Transport, postal & warehousing	1.2	3.2	5.7	90.0	100.0
Information media & telecommunications	1.0	2.8	6.3	89.9	100.0
Financial & insurance services	1.4	1.4	3.4	93.9	100.0
Rental, hiring & real estate services	19.9	np	15.5	np	100.0
Professional, scientific & technical services	8.2	24.5	42.8	24.5	100.0
Administrative & support services	3.5	14.7	21.1	60.7	100.0
Public administration & safety	np	np	np	np	100.0
Education & training	35.1	31.8	33.1	—	100.0
Health care & social assistance	6.9	26.5	36.0	30.6	100.0
Arts & recreation services	np	np	53.7	np	100.0
Other services	np	27.7	39.5	np	100.0
Total	3.3	7.7	19.1	69.8	100.0

2006–07 (a)					
Agriculture, forestry & fishing	11.1	18.3	37.1	33.5	100.0
Mining	2.0	7.6	12.1	78.3	100.0
Manufacturing	2.8	4.3	18.8	74.1	100.0
Electricity, gas, water & waste services	2.9	5.9	8.7	82.4	100.0
Construction	1.1	5.5	17.0	76.4	100.0
Wholesale trade	1.7	6.0	14.5	77.9	100.0
Retail trade	3.3	13.9	17.9	65.0	100.0
Accommodation & food services	np	—	np	np	100.0
Transport, postal & warehousing	1.5	3.8	11.2	83.4	100.0
Information media & telecommunications	1.4	2.1	7.5	89.0	100.0
Financial & insurance services	1.2	1.4	4.5	93.0	100.0
Rental, hiring & real estate services	16.5	20.9	19.1	43.6	100.0
Professional, scientific & technical services	8.1	24.1	41.4	26.3	100.0
Administrative & support services	2.6	8.1	15.1	74.3	100.0
Public administration & safety	np	np	np	np	100.0
Education & training	np	29.8	np	—	100.0
Health care & social assistance	5.0	29.6	30.0	35.4	100.0
Arts & recreation services	6.8	np	np	np	100.0
Other services	np	29.8	33.1	np	100.0
Total	3.3	8.5	18.6	69.6	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) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	CAPITAL EXPENDITURE			CURRENT EXPENDITURE			Total expenditure on R&D
	Land, buildings & other structures	Other capital expenditure	Total	Labour costs	Other current expenditure	Total	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	
2007–08							
Agriculture, forestry & fishing	6 997	7 922	14 919	36 321	62 669	98 990	113 909
Mining	24 731	130 558	155 289	476 330	2 650 927	3 127 257	3 282 546
Manufacturing	38 943	233 005	271 948	1 741 172	2 291 771	4 032 944	4 304 892
Electricity, gas, water & waste services	6 829	15 938	22 767	35 143	131 774	166 917	189 684
Construction	8 608	9 660	18 268	164 583	432 023	596 606	614 874
Wholesale trade	13 470	30 243	43 713	383 355	414 472	797 828	841 541
Retail trade	138	2 521	2 659	39 506	23 173	62 679	65 338
Accommodation & food services	np	np	822	np	np	16 310	17 132
Transport, postal & warehousing	1 306	13 791	15 097	58 744	118 162	176 906	192 003
Information media & telecommunications	1 359	16 663	18 022	180 799	615 680	796 479	814 501
Financial & insurance services	1 390	45 934	47 324	496 646	872 978	1 369 624	1 416 948
Rental, hiring & real estate services	366	9 978	10 344	20 103	38 994	59 098	69 442
Professional, scientific & technical services	21 866	86 218	108 084	1 196 746	925 622	2 122 368	2 230 452
Administrative & support services	np	np	10 230	33 192	32 408	65 600	75 830
Public administration & safety	np	np	1 984	np	np	3 344	5 328
Education & training	np	np	np	3 120	np	np	5 205
Health care & social assistance	np	np	7 298	22 276	27 132	49 408	56 706
Arts & recreation services	36	np	np	10 820	np	np	26 661
Other services	1 293	7 344	8 636	21 777	26 491	48 268	56 904
Total	132 380	627 568	759 948	4 929 508	8 690 440	13 619 948	14 379 896
2006–07 (a)							
Agriculture, forestry & fishing	3 600	8 275	11 875	31 161	81 096	112 257	124 132
Mining	7 135	196 440	203 575	364 639	2 204 671	2 569 310	2 772 885
Manufacturing	46 376	221 771	268 147	1 579 852	1 987 697	3 567 549	3 835 696
Electricity, gas, water & waste services	5 003	16 691	21 695	37 277	90 004	127 281	148 976
Construction	5 797	9 823	15 620	106 846	333 558	440 405	456 025
Wholesale trade	8 267	42 044	50 311	347 680	446 244	793 924	844 235
Retail trade	262	1 629	1 892	40 791	50 804	91 594	93 486
Accommodation & food services	np	np	np	np	np	np	np
Transport, postal & warehousing	1 422	10 185	11 607	58 685	68 237	126 922	138 529
Information media & telecommunications	1 443	16 764	18 207	211 353	568 133	779 486	797 693
Financial & insurance services	669	51 846	52 515	334 893	716 992	1 051 885	1 104 400
Rental, hiring & real estate services	731	5 531	6 262	13 373	20 087	33 460	39 722
Professional, scientific & technical services	17 688	79 848	97 536	1 120 380	779 135	1 899 515	1 997 051
Administrative & support services	182	2 809	2 991	32 478	34 832	67 310	70 301
Public administration & safety	np	np	np	np	np	np	np
Education & training	np	np	1 267	4 776	1 737	6 513	7 780
Health care & social assistance	222	2 909	3 131	20 223	18 692	38 915	42 046
Arts & recreation services	—	799	799	4 829	6 553	11 382	12 181
Other services	2 186	3 891	6 078	17 575	21 035	38 609	44 687
Total	101 386	674 080	775 466	4 332 528	7 440 888	11 773 416	12 548 882

— nil or rounded to zero (including null cells)

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

BUSINESS EXPENDITURE ON R&D, by industry—by type of expenditure:
proportions—2006–07 and 2007–08

	CAPITAL EXPENDITURE			CURRENT EXPENDITURE			Total expenditure on R&D
	Land, buildings & other structures	Other capital expenditure	Total	Labour costs	Other current expenditure	Total	
	%	%	%	%	%	%	
2007–08							
Agriculture, forestry & fishing	6.1	7.0	13.1	31.9	55.0	86.9	100.0
Mining	0.8	4.0	4.7	14.5	80.8	95.3	100.0
Manufacturing	0.9	5.4	6.3	40.4	53.2	93.7	100.0
Electricity, gas, water & waste services	3.6	8.4	12.0	18.5	69.5	88.0	100.0
Construction	1.4	1.6	3.0	26.8	70.3	97.0	100.0
Wholesale trade	1.6	3.6	5.2	45.6	49.3	94.8	100.0
Retail trade	0.2	3.9	4.1	60.5	35.5	95.9	100.0
Accommodation & food services	np	np	4.8	np	np	95.2	100.0
Transport, postal & warehousing	0.7	7.2	7.9	30.6	61.5	92.1	100.0
Information media & telecommunications	0.2	2.0	2.2	22.2	75.6	97.8	100.0
Financial & insurance services	0.1	3.2	3.3	35.1	61.6	96.7	100.0
Rental, hiring & real estate services	0.5	14.4	14.9	28.9	56.2	85.1	100.0
Professional, scientific & technical services	1.0	3.9	4.8	53.7	41.5	95.2	100.0
Administrative & support services	np	np	13.5	43.8	42.7	86.5	100.0
Public administration & safety	np	np	37.2	np	np	62.8	100.0
Education & training	np	np	np	59.9	np	np	100.0
Health care & social assistance	np	np	12.9	39.3	47.8	87.1	100.0
Arts & recreation services	0.1	np	np	40.6	np	np	100.0
Other services	2.3	12.9	15.2	38.3	46.6	84.8	100.0
Total	0.9	4.4	5.3	34.3	60.4	94.7	100.0
2006–07 (a)							
Agriculture, forestry & fishing	2.9	6.7	9.6	25.1	65.3	90.4	100.0
Mining	0.3	7.1	7.3	13.2	79.5	92.7	100.0
Manufacturing	1.2	5.8	7.0	41.2	51.8	93.0	100.0
Electricity, gas, water & waste services	3.4	11.2	14.6	25.0	60.4	85.4	100.0
Construction	1.3	2.2	3.4	23.4	73.1	96.6	100.0
Wholesale trade	1.0	5.0	6.0	41.2	52.9	94.0	100.0
Retail trade	0.3	1.7	2.0	43.6	54.3	98.0	100.0
Accommodation & food services	np	np	np	np	np	np	100.0
Transport, postal & warehousing	1.0	7.4	8.4	42.4	49.3	91.6	100.0
Information media & telecommunications	0.2	2.1	2.3	26.5	71.2	97.7	100.0
Financial & insurance services	0.1	4.7	4.8	30.3	64.9	95.2	100.0
Rental, hiring & real estate services	1.8	13.9	15.8	33.7	50.6	84.2	100.0
Professional, scientific & technical services	0.9	4.0	4.9	56.1	39.0	95.1	100.0
Administrative & support services	0.3	4.0	4.3	46.2	49.5	95.7	100.0
Public administration & safety	np	np	np	np	np	np	100.0
Education & training	np	np	16.3	61.4	22.3	83.7	100.0
Health care & social assistance	0.5	6.9	7.4	48.1	44.5	92.6	100.0
Arts & recreation services	—	6.6	6.6	39.6	53.8	93.4	100.0
Other services	4.9	8.7	13.6	39.3	47.1	86.4	100.0
Total	0.8	5.4	6.2	34.5	59.3	93.8	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) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	<i>Own funds</i>	<i>Other business</i>	<i>Commonwealth government</i>	<i>State & local government</i>	<i>Other Australian (a)</i>	<i>Overseas</i>	<i>Total expenditure on R&D</i>
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2007–08							
Agriculture, forestry & fishing	103 252	np	5 781	2 992	np	—	113 909
Mining	3 148 863	np	7 479	np	—	—	3 282 546
Manufacturing	4 069 335	57 390	115 468	3 568	1 867	57 264	4 304 892
Electricity, gas, water & waste services	177 476	2 083	5 016	4 326	np	np	189 684
Construction	597 623	8 210	6 457	np	—	np	614 874
Wholesale trade	745 499	np	22 433	202	np	14 712	841 541
Retail trade	63 300	np	902	np	—	np	65 338
Accommodation & food services	np	—	np	—	—	—	17 132
Transport, postal & warehousing	189 650	1 828	np	np	—	—	192 003
Information media & telecommunications	808 410	np	3 098	np	—	np	814 501
Financial & insurance services	1 407 334	3 856	5 489	np	np	np	1 416 948
Rental, hiring & real estate services	63 317	2 644	2 343	np	—	np	69 442
Professional, scientific & technical services	1 796 071	81 356	203 075	19 434	15 801	114 715	2 230 452
Administrative & support services	75 425	np	np	np	—	—	75 830
Public administration & safety	5 328	—	—	—	—	—	5 328
Education & training	np	np	179	—	—	—	5 205
Health care & social assistance	40 340	3 604	7 704	np	np	1 495	56 706
Arts & recreation services	24 663	np	np	np	np	—	26 661
Other services	51 884	np	2 984	—	np	—	56 904
Total	13 389 456	349 706	389 938	39 222	19 994	191 580	14 379 896

2006–07 (b)							
Agriculture, forestry & fishing	106 906	2 726	7 073	3 858	np	np	124 132
Mining	2 692 218	np	5 115	np	—	np	2 772 885
Manufacturing	3 500 260	48 489	146 861	29 975	4 855	105 255	3 835 696
Electricity, gas, water & waste services	137 172	4 944	3 628	np	np	np	148 976
Construction	441 563	7 970	np	—	—	np	456 025
Wholesale trade	733 783	np	30 227	np	np	12 088	844 235
Retail trade	90 784	np	1 056	np	—	—	93 486
Accommodation & food services	np	—	—	—	—	—	np
Transport, postal & warehousing	np	—	np	—	—	—	138 529
Information media & telecommunications	793 448	np	2 105	np	—	np	797 693
Financial & insurance services	1 096 591	5 378	2 101	np	np	—	1 104 400
Rental, hiring & real estate services	36 383	268	2 025	—	np	np	39 722
Professional, scientific & technical services	1 549 823	79 291	201 850	22 210	25 749	118 128	1 997 051
Administrative & support services	69 052	np	np	—	—	—	70 301
Public administration & safety	4 989	np	—	—	—	np	np
Education & training	7 482	—	298	—	—	—	7 780
Health care & social assistance	26 506	6 297	5 318	np	np	np	42 046
Arts & recreation services	12 181	—	—	—	—	—	12 181
Other services	40 593	np	1 941	np	707	np	44 687
Total	11 491 781	292 586	416 148	71 511	35 468	241 388	12 548 882

— nil or rounded to zero (including null cells)

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

(a) Includes funding from Joint business/government, Higher education and Private non-profit organisations.

(b) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

BUSINESS EXPENDITURE ON R&D, by industry—by source of funds: **proportions**—
2006–07 and 2007–08

	<i>Own funds</i>	<i>Other business</i>	<i>Commonwealth government</i>	<i>State & local government</i>	<i>Other Australian (a)</i>	<i>Overseas</i>	<i>Total expenditure on R&D</i>
	%	%	%	%	%	%	%
2007–08							
Agriculture, forestry & fishing	90.6	np	5.1	2.6	np	—	100.0
Mining	95.9	np	0.2	np	—	—	100.0
Manufacturing	94.5	1.3	2.7	0.1	—	1.3	100.0
Electricity, gas, water & waste services	93.6	1.1	2.6	2.3	np	np	100.0
Construction	97.2	1.3	1.1	np	—	np	100.0
Wholesale trade	88.6	np	2.7	—	np	1.7	100.0
Retail trade	96.9	np	1.4	np	—	np	100.0
Accommodation & food services	np	—	np	—	—	—	100.0
Transport, postal & warehousing	98.8	1.0	np	np	—	—	100.0
Information media & telecommunications	99.3	np	0.4	np	—	np	100.0
Financial & insurance services	99.3	0.3	0.4	np	np	np	100.0
Rental, hiring & real estate services	91.2	3.8	3.4	np	—	np	100.0
Professional, scientific & technical services	80.5	3.6	9.1	0.9	0.7	5.1	100.0
Administrative & support services	99.5	np	np	np	—	—	100.0
Public administration & safety	100.0	—	—	—	—	—	100.0
Education & training	np	np	3.4	—	—	—	100.0
Health care & social assistance	71.1	6.4	13.6	np	np	2.6	100.0
Arts & recreation services	92.5	np	np	np	np	—	100.0
Other services	91.2	np	5.2	—	np	—	100.0
Total	93.1	2.4	2.7	0.3	0.1	1.3	100.0
2006–07 (b)							
Agriculture, forestry & fishing	86.1	2.2	5.7	3.1	np	np	100.0
Mining	97.1	np	0.2	np	—	np	100.0
Manufacturing	91.3	1.3	3.8	0.8	0.1	2.7	100.0
Electricity, gas, water & waste services	92.1	3.3	2.4	np	np	np	100.0
Construction	96.8	1.7	np	—	—	np	100.0
Wholesale trade	86.9	np	3.6	np	np	1.4	100.0
Retail trade	97.1	np	1.1	np	—	—	100.0
Accommodation & food services	np	—	—	—	—	—	100.0
Transport, postal & warehousing	np	—	np	—	—	—	100.0
Information media & telecommunications	99.5	np	0.3	np	—	np	100.0
Financial & insurance services	99.3	0.5	0.2	np	np	—	100.0
Rental, hiring & real estate services	91.6	0.7	5.1	—	np	np	100.0
Professional, scientific & technical services	77.6	4.0	10.1	1.1	1.3	5.9	100.0
Administrative & support services	98.2	np	np	—	—	—	100.0
Public administration & safety	np	np	—	—	—	np	100.0
Education & training	96.2	—	3.8	—	—	—	100.0
Health care & social assistance	63.0	15.0	12.6	np	np	np	100.0
Arts & recreation services	100.0	—	—	—	—	—	100.0
Other services	90.8	np	4.3	np	1.6	np	100.0
Total	91.6	2.3	3.3	0.6	0.3	1.9	100.0

— nil or rounded to zero (including null cells)

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(a) Includes funding from Joint business/government, Higher education and Private non-profit organisations.

(b) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Overseas	Total expenditure on R&D
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2007–08										
Agriculture, forestry & fishing	25 643	6 464	17 681	13 715	28 226	17 326	3 945	—	909	113 909
Mining	637 437	176 491	568 766	246 916	1 592 922	18 608	36 730	np	np	3 282 546
Manufacturing	1 082 847	1 700 664	405 891	377 872	525 552	44 605	np	np	112 324	4 304 892
Electricity, gas, water & waste services	101 810	33 148	13 932	10 883	13 548	np	—	np	880	189 684
Construction	139 513	127 655	263 903	49 483	28 304	np	np	np	np	614 874
Wholesale trade	350 569	301 993	74 598	43 632	55 134	1 430	np	np	9 109	841 541
Retail trade	20 466	32 137	4 793	3 346	3 566	np	228	np	547	65 338
Accommodation & food services	np	np	5 269	np	np	np	np	—	np	17 132
Transport, postal & warehousing	60 472	101 828	15 376	7 687	np	np	—	np	np	192 003
Information media & telecommunications	234 218	485 037	38 777	19 573	21 492	np	—	np	3 232	814 501
Financial & insurance services	887 236	299 048	69 590	20 157	121 422	—	—	np	np	1 416 948
Rental, hiring & real estate services	18 159	34 689	5 747	np	6 092	np	—	—	—	69 442
Professional, scientific & technical services	712 936	565 303	439 721	117 659	202 791	24 151	3 363	60 096	104 433	2 230 452
Administrative & support services	40 325	22 073	9 607	np	1 926	—	np	np	np	75 830
Public administration & safety	2 656	np	—	—	np	np	—	—	np	5 328
Education & training	2 672	778	np	np	np	—	—	np	np	5 205
Health care & social assistance	26 517	20 318	5 036	1 393	3 031	np	—	—	np	56 706
Arts & recreation services	np	np	np	np	—	—	—	np	np	26 661
Other services	15 432	25 358	6 190	6 755	2 260	np	—	—	np	56 904
Total	4 371 105	3 949 045	1 949 795	929 402	2 608 998	131 932	80 702	99 934	258 985	14 379 896

2006–07 (a)										
Agriculture, forestry & fishing	28 306	8 190	19 056	15 492	36 416	15 389	np	np	295	124 132
Mining	560 617	168 216	463 407	253 795	1 279 344	10 437	34 545	np	np	2 772 885
Manufacturing	993 338	1 538 164	368 399	325 718	372 463	46 561	np	np	108 396	3 835 696
Electricity, gas, water & waste services	66 310	26 972	32 520	np	9 088	np	np	np	np	148 976
Construction	120 054	93 594	160 643	np	49 424	np	np	np	2 019	456 025
Wholesale trade	327 249	346 917	78 236	38 201	43 741	304	np	np	3 284	844 235
Retail trade	15 189	66 326	4 248	4 389	1 777	545	np	np	459	93 486
Accommodation & food services	np	np	5 029	np	np	np	—	—	—	np
Transport, postal & warehousing	62 050	48 121	16 933	6 250	502	np	—	np	np	138 529
Information media & telecommunications	327 094	344 831	67 626	18 066	26 473	np	np	4 403	2 274	797 693
Financial & insurance services	742 476	235 119	41 646	10 143	62 483	—	np	np	12 422	1 104 400
Rental, hiring & real estate services	15 394	15 927	5 054	np	3 134	np	—	—	np	39 722
Professional, scientific & technical services	659 143	483 278	397 127	120 825	185 880	21 508	1 987	59 227	68 077	1 997 051
Administrative & support services	48 538	9 754	7 643	np	1 403	—	np	984	781	70 301
Public administration & safety	3 177	np	np	np	—	—	—	—	np	np
Education & training	4 183	np	1 092	np	np	—	—	np	—	7 780
Health care & social assistance	22 130	11 811	3 935	np	2 611	np	—	—	797	42 046
Arts & recreation services	np	4 399	np	—	np	—	—	—	—	12 181
Other services	10 112	20 115	6 499	5 208	1 472	np	—	—	np	44 687
Total	4 010 428	3 427 666	1 681 937	841 051	2 077 181	105 078	108 760	94 020	202 761	12 548 882

— nil or rounded to zero (including null cells)

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Overseas	Total expenditure on R&D
	%	%	%	%	%	%	%	%	%	%
2007–08										
Agriculture, forestry & fishing	22.5	5.7	15.5	12.0	24.8	15.2	3.5	—	0.8	100.0
Mining	19.4	5.4	17.3	7.5	48.5	0.6	1.1	np	np	100.0
Manufacturing	25.2	39.5	9.4	8.8	12.2	1.0	np	np	2.6	100.0
Electricity, gas, water & waste services	53.7	17.5	7.3	5.7	7.1	np	—	np	0.5	100.0
Construction	22.7	20.8	42.9	8.0	4.6	np	np	np	np	100.0
Wholesale trade	41.7	35.9	8.9	5.2	6.6	0.2	np	np	1.1	100.0
Retail trade	31.3	49.2	7.3	5.1	5.5	np	0.3	np	0.8	100.0
Accommodation & food services	np	np	30.8	np	np	np	np	—	np	100.0
Transport, postal & warehousing	31.5	53.0	8.0	4.0	np	np	—	np	np	100.0
Information media & telecommunications	28.8	59.6	4.8	2.4	2.6	np	—	np	0.4	100.0
Financial & insurance services	62.6	21.1	4.9	1.4	8.6	—	—	np	np	100.0
Rental, hiring & real estate services	26.1	50.0	8.3	np	8.8	np	—	—	—	100.0
Professional, scientific & technical services	32.0	25.3	19.7	5.3	9.1	1.1	0.2	2.7	4.7	100.0
Administrative & support services	53.2	29.1	12.7	np	2.5	—	np	np	np	100.0
Public administration & safety	49.8	np	—	—	np	np	—	—	np	100.0
Education & training	51.3	14.9	np	np	np	—	—	np	np	100.0
Health care & social assistance	46.8	35.8	8.9	2.5	5.3	np	—	—	np	100.0
Arts & recreation services	np	np	np	np	—	—	—	np	np	100.0
Other services	27.1	44.6	10.9	11.9	4.0	np	—	—	np	100.0
Total	30.4	27.5	13.6	6.5	18.1	0.9	0.6	0.7	1.8	100.0

2006–07 (a)										
Agriculture, forestry & fishing	22.8	6.6	15.4	12.5	29.3	12.4	np	np	0.2	100.0
Mining	20.2	6.1	16.7	9.2	46.1	0.4	1.2	np	np	100.0
Manufacturing	25.9	40.1	9.6	8.5	9.7	1.2	np	np	2.8	100.0
Electricity, gas, water & waste services	44.5	18.1	21.8	np	6.1	np	np	np	np	100.0
Construction	26.3	20.5	35.2	np	10.8	np	np	np	0.4	100.0
Wholesale trade	38.8	41.1	9.3	4.5	5.2	—	np	np	0.4	100.0
Retail trade	16.2	70.9	4.5	4.7	1.9	0.6	np	np	0.5	100.0
Accommodation & food services	np	np	np	np	np	np	—	—	—	100.0
Transport, postal & warehousing	44.8	34.7	12.2	4.5	0.4	np	—	np	np	100.0
Information media & telecommunications	41.0	43.2	8.5	2.3	3.3	np	np	0.6	0.3	100.0
Financial & insurance services	67.2	21.3	3.8	0.9	5.7	—	np	np	1.1	100.0
Rental, hiring & real estate services	38.8	40.1	12.7	np	7.9	np	—	—	np	100.0
Professional, scientific & technical services	33.0	24.2	19.9	6.1	9.3	1.1	0.1	3.0	3.4	100.0
Administrative & support services	69.0	13.9	10.9	np	2.0	—	np	1.4	1.1	100.0
Public administration & safety	np	np	np	np	—	—	—	—	np	100.0
Education & training	53.8	np	14.0	np	np	—	—	np	—	100.0
Health care & social assistance	52.6	28.1	9.4	np	6.2	np	—	—	1.9	100.0
Arts & recreation services	np	36.1	np	—	np	—	—	—	—	100.0
Other services	22.6	45.0	14.5	11.7	3.3	np	—	—	np	100.0
Total	32.0	27.3	13.4	6.7	16.6	0.8	0.9	0.7	1.6	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) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	<i>Pure basic research</i>	<i>Strategic basic research</i>	<i>Applied research</i>	<i>Experimental development</i>	<i>Total expenditure on R&D</i>
	\$'000	\$'000	\$'000	\$'000	\$'000
2007–08					
Agriculture, forestry & fishing	1 092	11 567	48 876	52 374	113 909
Mining	7 665	164 598	1 272 900	1 837 383	3 282 546
Manufacturing	25 588	220 873	1 168 676	2 889 755	4 304 892
Electricity, gas, water & waste services	831	13 446	66 846	108 561	189 684
Construction	3 673	14 990	147 949	448 262	614 874
Wholesale trade	3 143	26 850	224 502	587 045	841 541
Retail trade	1 085	10 371	23 907	29 976	65 338
Accommodation & food services	—	—	1 020	16 112	17 132
Transport, postal & warehousing	210	22 260	49 022	120 511	192 003
Information media & telecommunications	1 043	20 496	150 268	642 693	814 501
Financial & insurance services	2 299	39 762	457 100	917 787	1 416 948
Rental, hiring & real estate services	651	2 837	19 303	46 651	69 442
Professional, scientific & technical services	23 997	160 123	901 176	1 145 156	2 230 452
Administrative & support services	619	1 999	30 022	43 190	75 830
Public administration & safety	—	np	2 463	np	5 328
Education & training	np	np	1 635	2 754	5 205
Health care & social assistance	1 934	7 482	27 790	19 500	56 706
Arts & recreation services	np	np	8 450	np	26 661
Other services	372	3 203	13 481	39 848	56 904
Total	74 263	724 061	4 615 386	8 966 187	14 379 896
2006–07 (a)					
Agriculture, forestry & fishing	1 253	8 747	45 644	68 489	124 132
Mining	8 104	181 561	997 820	1 585 400	2 772 885
Manufacturing	23 816	158 474	1 176 463	2 476 943	3 835 696
Electricity, gas, water & waste services	1 425	33 006	41 558	72 988	148 976
Construction	2 343	14 206	154 945	284 531	456 025
Wholesale trade	3 740	20 959	207 665	611 871	844 235
Retail trade	1 275	6 577	59 866	25 768	93 486
Accommodation & food services	—	—	1 380	np	np
Transport, postal & warehousing	np	np	46 483	79 211	138 529
Information media & telecommunications	705	20 651	162 196	614 141	797 693
Financial & insurance services	3 507	49 351	293 358	758 184	1 104 400
Rental, hiring & real estate services	498	1 539	11 390	26 295	39 722
Professional, scientific & technical services	23 907	131 017	819 615	1 022 512	1 997 051
Administrative & support services	np	np	38 031	29 956	70 301
Public administration & safety	np	173	2 053	np	np
Education & training	—	np	np	6 615	7 780
Health care & social assistance	1 762	7 389	17 762	15 133	42 046
Arts & recreation services	—	np	np	7 520	12 181
Other services	918	3 134	9 874	30 761	44 687
Total	73 442	651 895	4 091 792	7 731 753	12 548 882

— nil or rounded to zero (including null cells)

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	<i>Pure basic research</i>	<i>Strategic basic research</i>	<i>Applied research</i>	<i>Experimental development</i>	<i>Total expenditure on R&D</i>
	%	%	%	%	%
2007–08					
Agriculture, forestry & fishing	1.0	10.2	42.9	46.0	100.0
Mining	0.2	5.0	38.8	56.0	100.0
Manufacturing	0.6	5.1	27.1	67.1	100.0
Electricity, gas, water & waste services	0.4	7.1	35.2	57.2	100.0
Construction	0.6	2.4	24.1	72.9	100.0
Wholesale trade	0.4	3.2	26.7	69.8	100.0
Retail trade	1.7	15.9	36.6	45.9	100.0
Accommodation & food services	—	—	6.0	94.0	100.0
Transport, postal & warehousing	0.1	11.6	25.5	62.8	100.0
Information media & telecommunications	0.1	2.5	18.4	78.9	100.0
Financial & insurance services	0.2	2.8	32.3	64.8	100.0
Rental, hiring & real estate services	0.9	4.1	27.8	67.2	100.0
Professional, scientific & technical services	1.1	7.2	40.4	51.3	100.0
Administrative & support services	0.8	2.6	39.6	57.0	100.0
Public administration & safety	—	np	46.2	np	100.0
Education & training	np	np	31.4	52.9	100.0
Health care & social assistance	3.4	13.2	49.0	34.4	100.0
Arts & recreation services	np	np	31.7	np	100.0
Other services	0.7	5.6	23.7	70.0	100.0
Total	0.5	5.0	32.1	62.4	100.0

2006–07 (a)					
Agriculture, forestry & fishing	1.0	7.0	36.8	55.2	100.0
Mining	0.3	6.5	36.0	57.2	100.0
Manufacturing	0.6	4.1	30.7	64.6	100.0
Electricity, gas, water & waste services	1.0	22.2	27.9	49.0	100.0
Construction	0.5	3.1	34.0	62.4	100.0
Wholesale trade	0.4	2.5	24.6	72.5	100.0
Retail trade	1.4	7.0	64.0	27.6	100.0
Accommodation & food services	—	—	np	np	100.0
Transport, postal & warehousing	np	np	33.6	57.2	100.0
Information media & telecommunications	0.1	2.6	20.3	77.0	100.0
Financial & insurance services	0.3	4.5	26.6	68.7	100.0
Rental, hiring & real estate services	1.3	3.9	28.7	66.2	100.0
Professional, scientific & technical services	1.2	6.6	41.0	51.2	100.0
Administrative & support services	np	np	54.1	42.6	100.0
Public administration & safety	np	np	np	np	100.0
Education & training	—	np	np	85.0	100.0
Health care & social assistance	4.2	17.6	42.2	36.0	100.0
Arts & recreation services	—	np	np	61.7	100.0
Other services	2.1	7.0	22.1	68.8	100.0
Total	0.6	5.2	32.6	61.6	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) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	<i>Expenditure on R&D</i>	<i>Proportion of total expenditure on R&D</i>
	\$'000	%
Mathematical sciences	19 008	0.1
Physical sciences	28 976	0.2
Chemical sciences	227 566	1.6
Earth sciences	227 558	1.6
Environmental sciences	123 216	0.9
Biological sciences	99 843	0.7
Agricultural and veterinary sciences	320 935	2.2
Information and computing sciences	3 677 664	25.6
Engineering	7 921 163	55.1
Technology	661 957	4.6
Medical and health sciences	897 849	6.2
Built environment and design	70 789	0.5
Education	7 208	0.1
Economics	12 317	0.1
Commerce, management, tourism and services	71 206	0.5
Studies in human society	np	np
Psychology and cognitive sciences	2 646	—
Law and legal studies	1 416	—
Studies in creative arts and writing	6 151	—
Language, communication and culture	1 471	—
History and archaeology	np	np
Total	14 379 896	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) Based on the 2008 edition of the ANZSRC. Previous cycle estimates are available on an ASRC basis only. See Explanatory Notes 19 to 21 for details.

	<i>Expenditure on R&D</i>	<i>Proportion of total expenditure on R&D</i>
	\$'000	%
Defence	277 694	1.9
Economic development		
Plant production and plant primary products	177 949	1.2
Animal production and animal primary products	107 200	0.7
Mineral resources (excl. energy resources)	2 057 015	14.3
Energy	2 020 873	14.1
Manufacturing	4 521 627	31.4
Construction	728 961	5.1
Transport	245 570	1.7
Information and communication services	1 967 282	13.7
Commercial services and tourism	1 658 297	11.5
Economic framework	31 427	0.2
<i>Total</i>	13 516 200	94.0
Society		
Health	398 562	2.8
Education and training	24 925	0.2
Law, politics and community services	24 236	0.2
Cultural understanding	16 169	0.1
<i>Total</i>	463 893	3.2
Environment	117 370	0.8
Expanding knowledge	4 739	—
Total	14 379 896	100.0

— nil or rounded to zero (including null cells)

(a) Based on the 2008 edition of the ANZSRC. Previous cycle estimates are available on an ASRC basis only. See Explanatory Notes 19 to 21 for details.

BUSINESS HUMAN RESOURCES DEVOTED TO R&D(a), summary statistics—2005–06 to 2007–08

	HUMAN RESOURCES DEVOTED TO R&D			PROPORTION OF TOTAL HUMAN RESOURCES DEVOTED TO R&D		
	2005–06	2006–07	2007–08	2005–06	2006–07	2007–08
	PYE	PYE	PYE	%	%	%
Employment size						
0–4 persons	1 385	1 329	1 436	3.2	2.9	2.9
5–19 persons	5 965	5 922	6 428	13.7	12.8	13.1
20–199 persons	11 821	12 771	13 550	27.1	27.6	27.6
200 or more persons	24 516	26 304	27 700	56.1	56.8	56.4
Type of resource						
Researchers	23 794	24 719	25 415	54.5	53.4	51.7
Technicians	13 677	14 755	15 853	31.3	31.8	32.3
Other staff	6 216	6 853	7 846	14.2	14.8	16.0
Total human resources devoted to R&D	43 686	46 327	49 114	100.0	100.0	100.0

(a) 2005–06 and 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

BUSINESS HUMAN RESOURCES DEVOTED TO R&D(a), by industry: values and proportions—2005–06 to 2007–08

	HUMAN RESOURCES DEVOTED TO R&D			PROPORTION OF TOTAL HUMAN RESOURCES DEVOTED TO R&D		
	2005–06	2006–07	2007–08	2005–06	2006–07	2007–08
	PYE	PYE	PYE	%	%	%
Agriculture, forestry & fishing	503	516	543	1.2	1.1	1.1
Mining	2 668	3 049	3 482	6.1	6.6	7.1
Manufacturing	17 069	17 527	18 080	39.1	37.8	36.8
Electricity, gas, water & waste services	425	472	406	1.0	1.0	0.8
Construction	900	1 105	1 655	2.1	2.4	3.4
Wholesale trade	3 471	3 524	3 552	7.9	7.6	7.2
Retail trade	363	508	448	0.8	1.1	0.9
Accommodation & food services	np	np	67	np	np	0.1
Transport, postal & warehousing	456	572	590	1.0	1.2	1.2
Information media & telecommunications	1 706	1 846	1 709	3.9	4.0	3.5
Financial & insurance services	2 793	2 820	3 612	6.4	6.1	7.4
Rental, hiring & real estate services	102	183	288	0.2	0.4	0.6
Professional, scientific & technical services	12 169	13 093	13 486	27.9	28.3	27.5
Administrative & support services	395	377	399	0.9	0.8	0.8
Public administration & safety	44	np	34	0.1	np	0.1
Education & training	np	66	38	np	0.1	0.1
Health care & social assistance	215	273	296	0.5	0.6	0.6
Arts & recreation services	78	48	119	0.2	0.1	0.2
Other services	253	278	310	0.6	0.6	0.6
Total	43 686	46 327	49 114	100.0	100.0	100.0

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

(a) 2005–06 and 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	0–4 persons	5–19 persons	20–99 persons	200 or more persons	Total human resources devoted to R&D
	PYE	PYE	PYE	PYE	PYE
2007–08					
Agriculture, forestry & fishing	33	95	261	154	543
Mining	30	98	676	2 679	3 482
Manufacturing	300	1 226	4 521	12 033	18 080
Electricity, gas, water & waste services	19	39	82	266	406
Construction	28	143	278	1 206	1 655
Wholesale trade	66	404	819	2 263	3 552
Retail trade	33	131	130	154	448
Accommodation & food services	np	—	np	46	67
Transport, postal & warehousing	10	37	85	458	590
Information media & telecommunications	43	178	366	1 123	1 709
Financial & insurance services	40	129	227	3 216	3 612
Rental, hiring & real estate services	35	70	89	94	288
Professional, scientific & technical services	729	3 633	5 530	3 593	13 486
Administrative & support services	14	82	69	234	399
Public administration & safety	np	np	np	np	34
Education & training	8	19	11	—	38
Health care & social assistance	14	31	135	117	296
Arts & recreation services	np	np	77	np	119
Other services	np	100	169	np	310
Total	1 436	6 428	13 550	27 700	49 114

	2006–07 (a)				
Agriculture, forestry & fishing	18	109	203	185	516
Mining	20	103	530	2 395	3 049
Manufacturing	263	1 109	4 370	11 785	17 527
Electricity, gas, water & waste services	np	np	53	368	472
Construction	20	112	264	709	1 105
Wholesale trade	75	380	767	2 303	3 524
Retail trade	22	137	128	221	508
Accommodation & food services	np	—	np	np	np
Transport, postal & warehousing	15	40	77	440	572
Information media & telecommunications	25	154	455	1 212	1 846
Financial & insurance services	33	134	185	2 468	2 820
Rental, hiring & real estate services	32	57	51	43	183
Professional, scientific & technical services	718	3 306	5 323	3 746	13 093
Administrative & support services	18	48	74	237	377
Public administration & safety	—	6	9	np	np
Education & training	np	27	np	—	66
Health care & social assistance	12	55	102	103	273
Arts & recreation services	np	np	np	np	48
Other services	np	109	124	np	278
Total	1 329	5 922	12 771	26 304	46 327

— nil or rounded to zero (including null cells)

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	0–4 persons	5–19 persons	20–199 persons	200 or more persons	Total human resources devoted to R&D
	%	%	%	%	%
2007–08					
Agriculture, forestry & fishing	6.1	17.5	48.0	28.4	100.0
Mining	0.9	2.8	19.4	76.9	100.0
Manufacturing	1.7	6.8	25.0	66.6	100.0
Electricity, gas, water & waste services	4.6	9.6	20.3	65.5	100.0
Construction	1.7	8.6	16.8	72.9	100.0
Wholesale trade	1.9	11.4	23.1	63.7	100.0
Retail trade	7.5	29.3	28.9	34.3	100.0
Accommodation & food services	np	—	np	69.6	100.0
Transport, postal & warehousing	1.8	6.3	14.4	77.6	100.0
Information media & telecommunications	2.5	10.4	21.4	65.7	100.0
Financial & insurance services	1.1	3.6	6.3	89.0	100.0
Rental, hiring & real estate services	12.2	24.2	30.8	32.8	100.0
Professional, scientific & technical services	5.4	26.9	41.0	26.6	100.0
Administrative & support services	3.5	20.6	17.2	58.7	100.0
Public administration & safety	np	np	np	np	100.0
Education & training	21.5	48.7	29.8	—	100.0
Health care & social assistance	4.6	10.5	45.5	39.5	100.0
Arts & recreation services	np	np	64.1	np	100.0
Other services	np	32.3	54.3	np	100.0
Total	2.9	13.1	27.6	56.4	100.0

2006–07 (a)					
Agriculture, forestry & fishing	3.5	21.2	39.4	35.9	100.0
Mining	0.7	3.4	17.4	78.6	100.0
Manufacturing	1.5	6.3	24.9	67.2	100.0
Electricity, gas, water & waste services	np	np	11.2	78.0	100.0
Construction	1.8	10.2	23.9	64.2	100.0
Wholesale trade	2.1	10.8	21.8	65.3	100.0
Retail trade	4.3	27.0	25.2	43.5	100.0
Accommodation & food services	np	—	np	np	100.0
Transport, postal & warehousing	2.6	6.9	13.5	77.0	100.0
Information media & telecommunications	1.3	8.3	24.7	65.7	100.0
Financial & insurance services	1.2	4.7	6.6	87.5	100.0
Rental, hiring & real estate services	17.3	31.4	27.9	23.3	100.0
Professional, scientific & technical services	5.5	25.2	40.7	28.6	100.0
Administrative & support services	4.7	12.8	19.5	62.9	100.0
Public administration & safety	—	np	np	np	100.0
Education & training	np	41.1	np	—	100.0
Health care & social assistance	4.3	20.2	37.5	37.9	100.0
Arts & recreation services	np	np	np	np	100.0
Other services	np	39.2	44.6	np	100.0
Total	2.9	12.8	27.6	56.8	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) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	Researchers	Technicians	Other staff	Total human resources devoted to R&D
	PYE	PYE	PYE	PYE
2007–08				
Agriculture, forestry & fishing	165	240	138	543
Mining	1 123	1 315	1 044	3 482
Manufacturing	8 872	5 778	3 430	18 080
Electricity, gas, water & waste services	187	131	88	406
Construction	705	706	244	1 655
Wholesale trade	1 947	1 119	485	3 552
Retail trade	172	212	64	448
Accommodation & food services	24	36	7	67
Transport, postal & warehousing	254	207	129	590
Information media & telecommunications	991	545	174	1 709
Financial & insurance services	2 368	899	345	3 612
Rental, hiring & real estate services	136	112	40	288
Professional, scientific & technical services	7 893	4 119	1 474	13 486
Administrative & support services	187	162	51	399
Public administration & safety	10	23	2	34
Education & training	22	12	4	38
Health care & social assistance	150	104	42	296
Arts & recreation services	39	44	36	119
Other services	172	88	49	310
Total	25 415	15 853	7 846	49 114

2006–07 (a)				
Agriculture, forestry & fishing	172	219	124	516
Mining	1 159	1 128	762	3 049
Manufacturing	8 950	5 501	3 075	17 527
Electricity, gas, water & waste services	279	123	70	472
Construction	550	401	153	1 105
Wholesale trade	1 954	1 111	459	3 524
Retail trade	264	197	47	508
Accommodation & food services	np	np	np	np
Transport, postal & warehousing	257	213	102	572
Information media & telecommunications	964	741	140	1 846
Financial & insurance services	1 663	749	409	2 820
Rental, hiring & real estate services	77	77	28	183
Professional, scientific & technical services	7 885	3 899	1 309	13 093
Administrative & support services	175	151	52	377
Public administration & safety	np	np	np	np
Education & training	40	19	7	66
Health care & social assistance	138	97	38	273
Arts & recreation services	21	16	12	48
Other services	134	94	50	278
Total	24 719	14 755	6 853	46 327

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

	Researchers	Technicians	Other staff	Total human resources devoted to R&D
	%	%	%	%
2007–08				
Agriculture, forestry & fishing	30.3	44.2	25.5	100.0
Mining	32.2	37.8	30.0	100.0
Manufacturing	49.1	32.0	19.0	100.0
Electricity, gas, water & waste services	46.1	32.3	21.7	100.0
Construction	42.6	42.7	14.7	100.0
Wholesale trade	54.8	31.5	13.7	100.0
Retail trade	38.4	47.4	14.2	100.0
Accommodation & food services	36.6	53.5	9.9	100.0
Transport, postal & warehousing	43.0	35.1	21.9	100.0
Information media & telecommunications	58.0	31.9	10.2	100.0
Financial & insurance services	65.6	24.9	9.5	100.0
Rental, hiring & real estate services	47.1	38.9	14.0	100.0
Professional, scientific & technical services	58.5	30.5	10.9	100.0
Administrative & support services	46.8	40.6	12.7	100.0
Public administration & safety	27.9	66.0	6.2	100.0
Education & training	57.1	32.5	10.5	100.0
Health care & social assistance	50.6	35.1	14.2	100.0
Arts & recreation services	32.7	37.0	30.2	100.0
Other services	55.5	28.5	15.9	100.0
Total	51.7	32.3	16.0	100.0

2006–07 (a)				
Agriculture, forestry & fishing	33.3	42.5	24.1	100.0
Mining	38.0	37.0	25.0	100.0
Manufacturing	51.1	31.4	17.5	100.0
Electricity, gas, water & waste services	59.0	26.1	14.9	100.0
Construction	49.8	36.3	13.9	100.0
Wholesale trade	55.4	31.5	13.0	100.0
Retail trade	52.0	38.8	9.2	100.0
Accommodation & food services	np	np	np	100.0
Transport, postal & warehousing	44.9	37.2	17.9	100.0
Information media & telecommunications	52.2	40.2	7.6	100.0
Financial & insurance services	59.0	26.6	14.5	100.0
Rental, hiring & real estate services	42.1	42.3	15.5	100.0
Professional, scientific & technical services	60.2	29.8	10.0	100.0
Administrative & support services	46.3	39.9	13.8	100.0
Public administration & safety	np	np	np	100.0
Education & training	61.0	28.8	10.2	100.0
Health care & social assistance	50.5	35.4	14.1	100.0
Arts & recreation services	42.9	32.7	24.4	100.0
Other services	48.1	33.8	18.0	100.0
Total	53.4	31.8	14.8	100.0

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

(a) 2006–07 data have been revised. See the Revisions section of the Technical Note for details.

EXPLANATORY NOTES

DATA SOURCES

1 The statistics presented in this release have been compiled from data collected from businesses in the Survey of Research and Experimental Development (R&D) in respect of the year ended 30 June 2008. The survey was conducted by the Australian Bureau of Statistics (ABS) via mail questionnaire and a 92% response rate was achieved.

2 Gross domestic product and gross state product figures used to derive R&D expenditure ratios are referenced in the tables below.

GROSS DOMESTIC PRODUCT, current prices

	2003-04	2004-05	2005-06	2006-07	2007-08
	\$m	\$m	\$m	\$m	\$m
Gross domestic product	841 351	897 642	967 454	1 045 674	1 132 464

Source: *Australian National Accounts: National Income, Expenditure and Product, June 2009* (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
2005-06	316 882	235 284	181 969	64 543	118 183	18 355	12 423	19 815
2006-07	335 828	247 789	198 514	68 327	139 247	20 221	14 014	21 734
2007-08	359 883	267 966	214 027	73 262	156 752	21 300	15 617	23 365

Source: *Australian National Accounts, State Accounts, 2007-08* (cat. no. 5220.0)

STATISTICAL UNITS DEFINED ON THE ABS BUSINESS REGISTER

3 Statistical units are those entities from which statistics are collected, or about which statistics are compiled. In ABS economic statistics, the statistical unit is generally the business. The ABS Business Register (ABSBR) is used to record information about statistical units and is used to create the frames for most ABS economic collections.

4 The ABS uses an economic statistics units model on the ABSBR to describe the characteristics of businesses, and the structural relationships between related businesses. Within large, complex and diverse business groups, the units model is also used to define reporting units that can provide data to the ABS at suitable levels of detail.

5 This units model allocates businesses to one of two sub-populations:

- Businesses with a simple structure - Most businesses and organisations in Australia need to obtain an Australian Business Number (ABN). They are then included on the whole-of-government register of businesses, the Australian Business Register (ABR), which is maintained by the Australian Taxation Office (ATO). Most of these businesses have simple structures; therefore, the unit registered for an ABN will satisfy ABS statistical requirements. For these businesses, the ABS has aligned its statistical units structure with the ABN unit. The businesses with simple structures constitute the ATO maintained population (ATOMP), and the ABN unit is used as the statistical unit for all ABS economic collections.

EXPLANATORY NOTES *continued*

STATISTICAL UNITS DEFINED ON THE ABS BUSINESS REGISTER *continued*

■ Businesses with a complex structure - For the population of businesses where the ABN unit is not suitable for ABS statistical requirements, the ABS maintains its own units structure through direct contact with the business. These businesses constitute the ABS maintained population (ABSMP). This population consists typically of large, complex and diverse businesses. For businesses in the ABSMP, statistical units comprise the Enterprise Group, the Enterprise and the Type of Activity Unit (TAU). The range of activities across the Enterprise Group can be very diverse. The TAU represents a grouping of one or more business entities within the Enterprise that cover all of the operations within an industry subdivision and for which a basic set of financial production and employment data can be reported.

6 Together these two sub-populations (of ABN units and TAUs) make up the ABSBR population, from which R&D survey selections are sourced.

7 The current economic statistics units model was introduced into the ABS in mid 2002, to better use the information available as a result of The New Tax System (TNTS). For more information please refer to *Information Paper: Improvements in ABS Economic Statistics [Arising from The New Tax System]* (cat. no. 1372.0).

Unit splitting

8 In cases where a TAU is deemed to have significant activities applying to more than one industry subdivision, the TAU is split for statistical purposes. Where a TAU has been split, the provider is asked to report data for all activities covered by the TAU (i.e. the TAU remains the collection unit). The data is then apportioned across the separate TAU splits (the statistical units) by ABS staff using factors determined during business profiling. TAU splits were implemented in the R&D survey for the first time, in the 2005–06 cycle, and were applied for previous cycles according to revision rules outlined in the Technical Note.

DEFINITIONS

9 R&D as collected by the ABS is defined in accordance with the OECD standard as 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of 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 these data.

10 Expenditures in this release represent R&D performed by the business itself (intramural). R&D funded by a business but performed wholly by another on their behalf (extramural) is out of scope of the survey. However, payments for analytical work, engineering or specialised services which form part of an R&D project performed by the business, are in scope of the survey.

11 For a more comprehensive interpretation of the definition of R&D, see the *Australian and New Zealand Standard Research Classification (ANZSRC), 2008* (cat. no. 1297.0) or refer to the OECD publication *Proposed Standard Practice for Surveys of Research and Experimental Development ('Frascati Manual' 2002)*.

SCOPE AND COVERAGE

12 Due to strong growth in the number of businesses performing R&D, changes were made to the scope of the R&D survey from the 2005–06 cycle to enable continued release of detailed R&D statistics within available resources. Prior to this, the survey scope included all businesses within the Australian business sector (i.e. all businesses and the private non-profit institutions mainly serving them) but excluded businesses mainly engaged in Agriculture, forestry and fishing. From 2005–06, the scope was adjusted to exclude businesses with expenditure on R&D of less than \$100,000 in the reference period. Offsetting this change, however, was the inclusion of businesses classified to Division A (Agriculture, forestry and fishing) of the Australian and New Zealand Standard Industrial Classification (ANZSIC). The scope changes were not

EXPLANATORY NOTES *continued*

SCOPE AND COVERAGE

continued

backcast for previous reference periods, given their offsetting nature and their relatively minor impact on key survey estimates.

13 It is estimated that the exclusion of businesses with R&D expenditure of less than \$100,000 has resulted in total business expenditure on R&D being understated by less than 1%. Users should, however, exercise caution when comparing estimates for businesses with 0–4 employees prior to 2005–06, as the majority of units with expenditure below \$100,000 fell into this employment size range. Most affected were estimates of PYE.

14 Businesses were included in the survey if they:

- reported expenditure on R&D in previous surveys;
- applied for an AusIndustry administered R&D Tax Concession and/or grant for industry R&D;
- indicated expenditure on R&D of \$100,000 or more in the reference year, via a coverage questionnaire; or
- were identified through other sources such as newspapers, journals, research compendia etc. as likely to have expenditure on R&D.

INDUSTRY CLASSIFICATION

15 The statistics in this release are classified to industry in accordance with the *Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006* (cat. no. 1292.0).

16 Each ABN unit/TAU is classified by the ABS to the industry in which it mainly operates. In accordance with standards set out in the Frascati Manual, for cases where an Enterprise Group sets up a dedicated research unit, that unit is classified to the predominant industry of the group rather than to Scientific research services (ANZSIC 6910).

EMPLOYMENT SIZE

17 For output purposes, businesses are classified to employment size ranges based on data reported in the survey. Businesses were asked to report the number of persons working for the business during the last pay period ending in June 2008.

LOCATION OF EXPENDITURE

18 Location of expenditure relates to the region(s) in which the business reported having performed R&D during the reference period. This may not be the head office location of the business.

AUSTRALIAN AND NEW ZEALAND STANDARD RESEARCH CLASSIFICATION

19 Field of research, Socio-economic objective, and Type of activity statistics presented in this release have been collected and compiled based on the *Australian and New Zealand Standard Research Classification (ANZSRC), 2008* (cat. no. 1297.0). Earlier issues of this release used the Australian Standard Research Classification (ASRC).

20 Data providers self-classify R&D expenditure based on their interpretation of OECD/ABS definitions. The ABS makes every effort to ensure correct and consistent interpretation and reporting of these data and applies consistent processing methodologies. See also the Reliability of Statistics and Revisions section of the Technical Note.

21 The ABS has not compiled previous cycle estimates on an ANZSRC basis or 2007–08 estimates on an ASRC basis. Previous cycle data compiled on an ASRC basis (including revised data for 2005–06 and 2006–07) are available in the data cubes accompanying this release.

CHAIN VOLUME MEASURES

22 The chain volume measures appearing in this release are annually reweighted chain Laspeyres indexes referenced to the current price values in a chosen reference year (currently 2007–08). 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

EXPLANATORY NOTES *continued*

CHAIN VOLUME MEASURES *continued*

in Section 15 of the *Information Paper: Australian National Accounts, Introduction of Chain Volume Measures and Price Indexes* (cat. no. 5248.0).

23 Deflators used to calculate the chain volume measure of expenditure on R&D have been revised to: better capture changes in the unit value of labour used in the production of R&D services; and to increase and refine the number of products included in the deflators. This release presents chain volume estimates calculated using the revised deflators, for the first time.

RELATED RELEASES

24 Users may also wish to refer to the following ABS releases:

Australian and New Zealand Standard Research Classification (ANZSRC), 2008
(cat. no. 1297.0)

Innovation in Australian Business, 2006–07 (cat. no. 8158.0)

Research and Experimental Development, All Sector Summary, Australia, 2006–07
(cat. no. 8112.0)

Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2006–07 (cat. no. 8109.0)

Research and Experimental Development, Higher Education Organisations, Australia, 2006 (cat. no. 8111.0)

Selected Characteristics of Australian Business, 2007–08 (cat. no. 8167.0)

Summary of IT Use and Innovation in Australian Business, 2007–08 (cat. no. 8166.0)

25 Relevant OECD publications include:

Main Science and Technology Indicators 2009/1

Proposed Standard Practice for Surveys of Research and Experimental Development ('Frascati Manual' 2002)

ABS WEBSITE

26 Other information, including data cubes in spreadsheet format, relating to R&D and innovation can be found on the ABS website <www.abs.gov.au>. See the Innovation, Science and Technology Home page under Themes/Industry.

ABS DATA AVAILABLE ON REQUEST

27 As well as the statistics included in this and related releases, 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

28 Where figures have been rounded, discrepancies may occur between the sum 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, recording or processing of data. These errors can be introduced through inadequacies in the questionnaire, treatment of non-response, inaccurate reporting by data 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 release, the reliability and comparability of the estimates may be affected by the following specific non-sampling errors:

- Many businesses provided estimates due to a lack of separately recorded data on R&D activity.
- Some businesses may not have reported data as per the definition of R&D used in this survey. This is potentially a result of slight differences in the survey definition of R&D and those used in: industry R&D schemes for the allocation of grants; and the AusIndustry administered R&D Tax Concession scheme for tax deductibility for specific R&D activities.
- Data were self-classified by businesses to Field of research, Socio-economic objective and Type of activity at the time of reporting. Some businesses 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.
- The estimation method for R&D related overhead costs varied across businesses and reference periods.

Treatment of non-response

4 Non-responding businesses which reported R&D activity in the previous cycle, had data imputed based on the 2007–08 expected R&D expenditure provided in 2006–07.

5 Data are not imputed for non-responding businesses which have not previously reported R&D activity. These units are not expected to have significant levels of R&D activity.

REVISIONS

6 Revisions to previous cycle data occur on discovery of:

- errors in previously reported data, typically a result of the specific non-sampling errors outlined in the Reliability of Statistics section above; and
- newly identified R&D performers who indicated they had significant levels of R&D in earlier years (details are collected and used to revise previously released estimates).

7 Revisions are only applied, up to two cycles prior to the current cycle, where the impact on:

- R&D expenditure is equal to \$5 million or more;
- Human resources devoted to R&D is equal to 25 PYE or more; or
- Published level data is of proportional significance.

8 In processing 2007–08 data, revisions were applied to 2005–06 and 2006–07 estimates. This must be taken into consideration when interpreting results, particularly when comparing estimates over time.

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 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 which is 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.
Commonwealth government funds	As a source of R&D funding, this includes: R&D grants; and payments for R&D projects carried out on contract for Commonwealth government organisations.
Employees	Persons who worked for a private or public employer and received pay for the reference period in the form of wages or salaries, a commission while also receiving a retainer, tips, piece rates or payment in kind. Persons who operated their own incorporated business with or without hiring employees are also included as employees.
Experimental development	Systematic work, using existing knowledge gained from research or practical experience, which is directed to producing new materials, products, devices, policies, behaviours or outlooks; to installing new processes, systems and services; or to improving substantially those already produced or installed.
Field of research (FOR)	The FOR classification allows R&D activity to be categorised according to the methodology used in the R&D, rather than the activity of the unit performing the R&D or the purpose of the R&D. The FOR reflects the field in which the research was undertaken and is based on the processes and techniques used.
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.
Joint business/government funds	As a source of R&D funding, this includes R&D funding raised via industry levies.
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.
Location	The region(s) in which the business performed the R&D. This may not be the head office location of the business.
Other business funds	As a source of R&D funding, this includes payments for R&D projects carried out on contract for other businesses located in Australia. Transfers from related entities are only included if they specifically relate to R&D being undertaken (by the collected business) on behalf of the related entity.
Other current expenditure	All other non-staff expenditures including: 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 business; commission and consultant expenses for research projects carried out by the business (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 staff	Skilled and unskilled craftpersons, secretarial and clerical staff directly associated with

GLOSSARY *continued*

R&D activity.

Overseas funds	As a source of R&D funding, this includes grants and payments for R&D projects carried out on contract for overseas organisations. Transfers from related entities are only included if they specifically relate to R&D being undertaken (by the collected business) on behalf of the related entity.
Overseas location	Includes R&D performed overseas, but controlled by the Australian business. This includes analytical work, engineering or other specialised services performed by another organisation which are part of an R&D project being performed by the Australia business.
Own funds	Includes all funding for R&D sourced from the business itself, including: equity; borrowings; retained earnings; and non-R&D specific transfers from related entities.
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.
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 (SEO)	The SEO classification allows R&D activity to be categorised according to the intended purpose or outcome of the research, rather than the processes or techniques used in order to achieve this objective. The SEO reflects the dominant beneficiary or beneficiaries of the research output.
State and local government funds	As a source of R&D funding, this includes: R&D grants; and payments for R&D projects carried out on contract for State and Local government organisations.
Strategic basic research	Experimental and theoretical work undertaken to acquire new knowledge directed in specified broad areas in the expectation of practical discoveries. It provides the broad base of knowledge necessary 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, etc.
Type of 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 . . .

INTERNET **www.abs.gov.au** the ABS website is the best place for data from our publications and information about the ABS.

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PHONE 1300 135 070

EMAIL client.services@abs.gov.au

FAX 1300 135 211

POST Client Services, ABS, GPO Box 796, Sydney NSW 2001

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