Australian Bureau of Statistics

2008–09

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RESEARCH AND EXPERIMENTAL DEVELOPMENT

AUSTRALIA

GOVERNMENT AND PRIVATE NON-PROFIT ORGANISATIONS

EMBARGO: 11.30AM (CANBERRA TIME) THURS 15 JUL 2010

CONTENTS

INQUIRIES

For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070 or Fiona Manson on Perth (08) 9360 5213.

NOTES

INTRODUCTION

This release presents statistics on Research and Experimental Development (R&D) undertaken by Australian government and private non-profit organisations in respect of the financial year ended 30 June 2009. These statistics, as well as time series data, are also available in spreadsheet format (data cubes); see the Downloads page for this issue (cat. no. 8109.0) on the ABS website <www.abs.gov.au>.

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

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 issues 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 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 of the Technical Note.

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

Brian Pink
Australian Statistician

LIST OF TABLES

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ABBREVIATIONS

$'000	thousand dollars
$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZSRC	Australian and New Zealand Standard Research Classification
ASRC	Australian Standard Research Classification
Aust.	Australia
excl.	excluding
FOR	Fields of Research
GDP	gross domestic product
GOVERD	government expenditure on R&D
GSP	gross state product
NPIs	non-profit institutions
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Co-operation and Development
PNP	private non-profit
PNPERD	private non-profit expenditure on R&D
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

CHAPTER 1 GOVERNMENT RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

GOVERNMENT RESOURCES DEVOTED TO R&D

During the 2008–09 financial year, expenditure on R&D by Australian government organisations was $3,420 million. Over the same period, human resources devoted to R&D by these organisations represented 17, 042 person years of effort (PYE).

GOVERNMENT RESOURCES DEVOTED TO R&D

		1998–99	*2000–01*	*2002–03*	*2004–05*	*2006–07*	*2008–09*
Expenditure on R&D - Current prices							
Commonwealth	$m	1 179	1 405	1 531	1 544	r2 046	2 252
State/territory	$m	864	951	951	942	r1 049	1 169
Total	$m	*2 043*	*2 356*	*2 482*	*2 486*	r*3 095*	*3 420*
Expenditure on R&D - Chain volume measures(a)							
Commonwealth	$m	1 775	1 929	2 008	1 775	2 173	2 252
State/territory	$m	1 299	1 306	1 247	1 082	1 115	1 169
Total	$m	*3 074*	*3 234*	*3 255*	*2 857*	*3 287*	*3 420*
Human resources devoted to R&D							
Commonwealth	PYE	9 353	9 565	10 185	9 368	r9 481	9 209
State/territory	PYE	9 069	8 587	8 357	7 320	r7 279	7 834
Total	PYE	*18 422*	*18 151*	*18 542*	*16 687*	r*16 760*	*17 042*

r revised

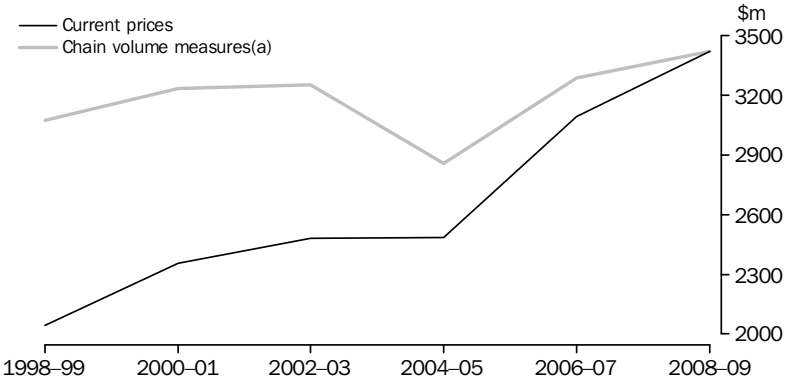
(a) The reference year for chain volume measures is 2008–09. See Explanatory Notes 30 and 31 for details.

Commonwealth government organisations contributed 66% ($2,252 million) to total GOVERD and 54% (9,209 PYE) of total human resources devoted to government R&D in 2008–09. This compares to contributions of 34% ($1,169 million) and 46% (7,834 PYE), respectively, by State and territory government organisations.

GOVERNMENT EXPENDITURE ON R&D (GOVERD)

In 2008–09, GOVERD showed an increase of 10% in current price terms from 2006–07 and 4% in chain volume terms.

GOVERNMENT EXPENDITURE ON R&D



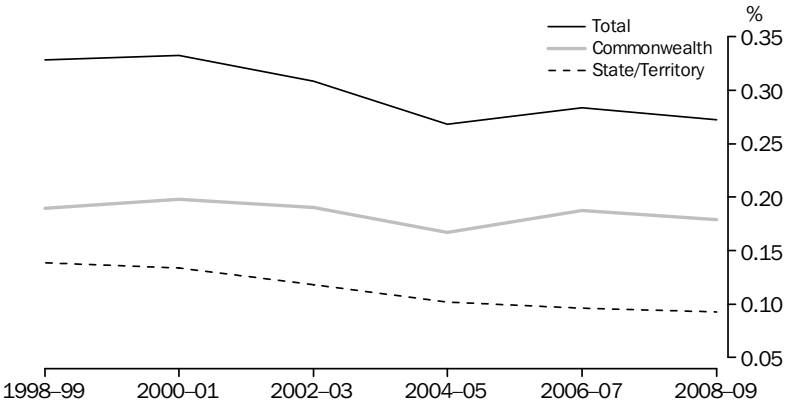
(a) The reference year for chain volume measures is 2008–09. See Explanatory Notes 30 and 31 for details.

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

GOVERD and gross domestic product (GDP)

At a whole of government level, GOVERD as a proportion of GDP decreased from 0.28% in 2006–07 to 0.27% in 2008–09. Over the same period, both Commonwealth government and State and territory government also showed decreases of 0.01 percentage points in their GOVERD/GDP ratios.

GOVERD, as a proportion of GDP(a)



(a) See Explanatory Notes 28 and 29 for details.

GOVERD and gross domestic product (GDP) continued

The following table shows GOVERD/GDP ratios for Organisation for Economic Co-operation and Development (OECD) countries.

GOVERD/GDP RATIOS OF OECD COUNTRIES(a)(b)(c)

	2004–05	*2005–06*	*2006–07*	*2007–08*	*2008–09*
	%	%	%	%	%
Iceland	na	0.65	0.61	0.48	0.47
Korea	0.32	0.33	0.35	0.37	na
Germany	0.34	0.35	0.35	0.35	na
New Zealand	na	0.30	na	0.33	na
France	0.37	0.37	0.35	0.32	0.33
Czech Republic	0.28	0.28	0.29	0.32	0.31
Finland	0.33	0.33	0.32	0.29	0.30
United States of America	0.31	0.31	0.30	0.29	0.29
Japan	0.30	0.28	0.28	0.27	na
Australia	**0.28**	**na**	**0.28**	**na**	**0.27**
Spain	0.17	0.19	0.20	0.22	0.25
Luxembourg	0.18	0.19	0.20	0.21	0.25
Norway	0.25	0.24	0.24	0.25	0.24
Hungary	0.26	0.27	0.25	0.23	na
Netherlands	0.26	0.24	0.23	0.22	na
Poland	0.22	0.21	0.21	0.20	0.21
Canada	0.18	0.20	0.20	0.19	0.19
Sweden	0.11	0.18	0.17	0.17	0.17
Belgium	0.14	0.15	0.15	0.15	0.17
Italy	0.20	0.19	0.20	0.17	0.16
United Kingdom	0.18	0.18	0.18	0.16	0.16
Slovak Republic	0.16	0.15	0.16	0.16	0.15
Austria	0.12	0.13	0.13	0.14	na
Greece	0.11	0.12	0.12	0.12	na
Portugal	0.12	0.12	0.12	0.11	0.12
Mexico	0.10	0.10	0.10	0.10	na
Ireland	0.09	0.09	0.09	0.09	0.11
Denmark	0.17	0.16	0.16	0.08	0.09
Turkey	0.04	0.07	0.07	0.08	na
Switzerland	0.03	na	0.02	na	0.02
Total OECD	**0.26**	**0.26**	**0.26**	**0.25**	**na**

na not available

(a) Except for Australia, the GOVERD/GDP ratios shown for OECD countries are sourced from *Main Science and Technology Indicators, 2009/2,* OECD. Ratios for Australia have been calculated using the most recent ABS values for GOVERD and GDP. See Explanatory Notes 28 and 29.

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

(c) Countries are ranked by the most recent available GOVERD/GDP ratio.

Type of expenditure

In 2008–09, GOVERD comprised of $3,018 million in Current expenditure and $402 million in Capital expenditure. The largest component of Current expenditure and GOVERD was Labour costs, at $1,690 million (56% of Current expenditure and 49% of total GOVERD).

Of all types of expenditure components, capital expenditure on Land, buildings and other structures showed the largest percentage increase (43%) from 2006–07, however it remained the lowest dollar value contributor to total GOVERD (at $163 million or 5% of total GOVERD).

Source of funds

As in previous years, the majority of GOVERD in 2008–09 was sourced from Own funds at $2,287 million (or 67%). The next largest source of R&D funds in 2008–09 was Other commonwealth government at $449 million (or 13% of GOVERD).

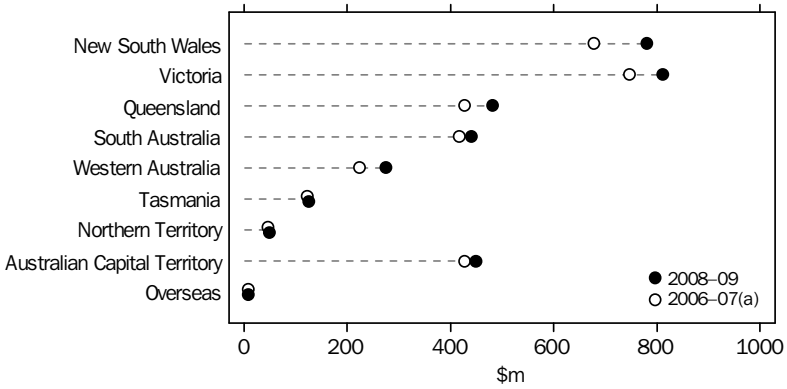
The largest percentage increase (132%) from 2006–07 was reported for funds sourced from Private non-profit organisations (an increase of $51 million). In 2008–09, this source of funds was the only source to show an increase of more than one percentage point in its proportional share of GOVERD from 2006–07.

Location of expenditure

Location of expenditure relates to the region in which R&D activity was performed; see also Explanatory Note 27. GOVERD in Victoria ($811 million) and New South Wales ($780 million) accounted for almost half (47%) of total GOVERD in 2008–09.

From 2006–07, New South Wales recorded the highest growth in dollar terms (up $103 million), followed by Victoria (up $65 million). Western Australia recorded the largest percentage increase from 2006–07, up 22% ($50 million).

GOVERD, by location of expenditure



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

In 2008–09, GOVERD as a proportion of gross state product (GSP) remained steady from 2006–07 for New South Wales, Queensland and Western Australia. GOVERD/GSP ratios for all other locations show decreases from 2006–07, with the Australian Capital Territory recording the largest decrease (down 0.14 percentage points).

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

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	%	%	%	%	%	%	%	%
2006–07								
Commonwealth	0.10	0.20	0.09	0.42	0.07	0.53	0.13	1.86
State/territory	0.09	0.08	0.11	0.16	0.09	0.05	0.19	0.02
Total	*0.19*	*0.29*	*0.20*	*0.58*	*0.16*	*0.58*	*0.32*	*1.87*
2008–09								
Commonwealth	0.12	0.19	0.08	0.39	0.08	0.51	0.19	1.68
State/territory	0.08	0.09	0.12	0.17	0.08	0.03	0.09	0.05
Total	*0.19*	*0.28*	*0.20*	*0.56*	*0.16*	*0.54*	*0.29*	*1.73*

(a) See Explanatory Note 28 for details.

Type of activity

The distribution of GOVERD across type of activity in 2008–09 was largely unchanged from 2006–07. As observed for 2006–07, more than half of GOVERD was directed into Applied research (56% or $1,913 million in 2008–09) and over a quarter into Strategic basic research (26% or $892 million in 2008–09).

Field of research (FOR)

The FORs attracting the largest amounts of GOVERD in 2008–09 were Engineering ($611 million), Agricultural and veterinary sciences ($545 million) and Medical and health sciences ($452 million). These three FORs accounted for 18%, 16% and 13% of total GOVERD, respectively.

Socio-economic objective (SEO)

In 2008–09, more than half (57%) of GOVERD was directed to the SEO sectors of Economic development ($1,159 million or 34%) and Environment ($794 million or 23%).

At the SEO division level, a similar proportion of GOVERD (53%) was attributable to Environment ($794 million or 23%), Health ($544 million or 16%) and Defence ($486 million or 14%) in 2008–09.

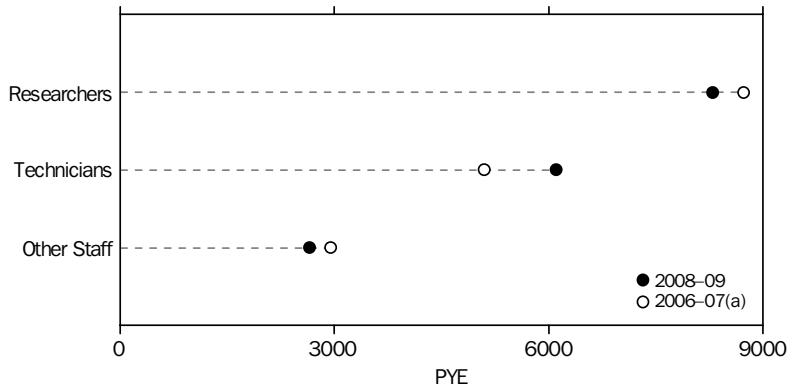
GOVERNMENT HUMAN RESOURCES DEVOTED TO R&D

Government human resources devoted to R&D in 2008–09 increased by 2%, or 282 person years of effort (PYE), from 2006–07. This increase was solely due to an increase in PYE for Technicians (up 20% or 1,010 PYE).

Both remaining types of human resource showed decreases in effort devoted to R&D; Researchers down 436 PYE or 5% from 2006–07 and Other staff down 291 PYE or 10%.

Researchers remained the highest contributing type of human resource in 2008–09, accounting for 49% of total effort compared to 52% in 2006–07.

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



(a) 2006-07 data have been revised. Refer to the Revisions section of the Technical Note for details.

1.1 GOVERNMENT EXPENDITURE ON R&D, summary statistics—2006–07 and 2008–09(a)

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2006–07(a)	*2008–09*	*2006–07*(a)	*2008–09*	*2006–07*(a)	*2008–09*
	$'000	$'000	$'000	$'000	$'000	$'000
Type of expenditure						
Capital expenditure						
Land, buildings & other structures	51 086	91 693	63 280	71 412	114 366	163 105
Other capital expenditure	181 672	197 929	36 638	41 352	218 310	239 281
Total	*232 758*	*289 622*	*99 918*	*112 764*	*332 676*	*402 386*
Current expenditure						
Labour costs	1 034 413	1 098 115	535 768	592 364	1 570 181	1 690 479
Other current expenditure	778 783	864 204	413 791	463 399	1 192 574	1 327 603
Total	*1 813 196*	*1 962 319*	*949 559*	*1 055 763*	*2 762 755*	*3 018 082*
Source of funds						
Own funds	1 513 772	1 658 907	556 474	628 304	2 070 246	2 287 211
Other commonwealth government	270 925	297 037	123 498	151 597	394 423	448 634
Other state & local government	47 875	67 439	99 208	100 042	147 083	167 481
Private non-profit organisations	9 280	14 802	29 060	74 334	38 340	89 136
Business	105 863	107 616	59 501	65 877	165 364	173 493
Joint government/business	50 919	42 876	140 631	123 275	191 550	166 151
Universities	10 859	15 308	7 893	5 469	18 752	20 777
Donations & bequests	—	—	8 573	1 426	8 573	1 426
Other Australian	—	43	4 142	465	4 142	508
Overseas	36 461	47 913	20 497	17 738	56 958	65 651
Location of expenditure						
New South Wales	368 474	469 506	308 742	310 897	677 216	780 403
Victoria	527 560	554 501	218 605	256 856	746 166	811 357
Queensland	189 677	192 762	237 171	288 010	426 848	480 771
South Australia	301 960	308 136	115 224	132 621	417 183	440 758
Western Australia	98 285	136 649	126 174	137 955	224 459	274 605
Tasmania	113 052	118 523	9 842	6 759	122 894	125 282
Northern Territory	18 360	32 748	27 542	16 243	45 902	48 990
Australian Capital Territory	423 100	435 524	3 653	13 469	426 753	448 993
Overseas	5 486	3 592	2 525	5 717	8 011	9 309
Type of activity						
Pure basic research	91 505	94 682	51 325	49 080	142 830	143 762
Strategic basic research	581 286	577 684	241 811	314 484	823 097	892 168
Applied research	1 086 637	1 241 936	627 939	671 534	1 714 576	1 913 470
Experimental development	286 526	337 639	128 402	133 429	414 927	471 068
Total expenditure on R&D	**2 045 954**	**2 251 941**	**1 049 477**	**1 168 527**	**3 095 431**	**3 420 468**

— nil or rounded to zero (including null cells)

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

1.2 GOVERNMENT EXPENDITURE ON R&D, summary statistics: **proportions**—2006–07 and 2008–09(a)

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2006–07(a)	*2008–09*	*2006–07*(a)	*2008–09*	*2006–07*(a)	*2008–09*
	%	%	%	%	%	%
Type of expenditure						
Capital expenditure						
Land, buildings & other structures	2.5	4.1	6.0	6.1	3.7	4.8
Other capital expenditure	8.9	8.8	3.5	3.5	7.1	7.0
Total	*11.4*	*12.9*	*9.5*	*9.7*	*10.7*	*11.8*
Current expenditure						
Labour costs	50.6	48.8	51.1	50.7	50.7	49.4
Other current expenditure	38.1	38.4	39.4	39.7	38.5	38.8
Total	*88.6*	*87.1*	*90.5*	*90.3*	*89.3*	*88.2*
Source of funds						
Own funds	74.0	73.7	53.0	53.8	66.9	66.9
Other commonwealth government	13.2	13.2	11.8	13.0	12.7	13.1
Other state & local government	2.3	3.0	9.5	8.6	4.8	4.9
Private non-profit organisations	0.5	0.7	2.8	6.4	1.2	2.6
Business	5.2	4.8	5.7	5.6	5.3	5.1
Joint government/business	2.5	1.9	13.4	10.5	6.2	4.9
Universities	0.5	0.7	0.8	0.5	0.6	0.6
Donations & bequests	—	—	0.8	0.1	0.3	—
Other Australian	—	—	0.4	—	0.1	—
Overseas	1.8	2.1	2.0	1.5	1.8	1.9
Location of expenditure						
New South Wales	18.0	20.8	29.4	26.6	21.9	22.8
Victoria	25.8	24.6	20.8	22.0	24.1	23.7
Queensland	9.3	8.6	22.6	24.6	13.8	14.1
South Australia	14.8	13.7	11.0	11.3	13.5	12.9
Western Australia	4.8	6.1	12.0	11.8	7.3	8.0
Tasmania	5.5	5.3	0.9	0.6	4.0	3.7
Northern Territory	0.9	1.5	2.6	1.4	1.5	1.4
Australian Capital Territory	20.7	19.3	0.3	1.2	13.8	13.1
Overseas	0.3	0.2	0.2	0.5	0.3	0.3
Type of activity						
Pure basic research	4.5	4.2	4.9	4.2	4.6	4.2
Strategic basic research	28.4	25.7	23.0	26.9	26.6	26.1
Applied research	53.1	55.1	59.8	57.5	55.4	55.9
Experimental development	14.0	15.0	12.2	11.4	13.4	13.8
Total expenditure on R&D	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— nil or rounded to zero (including null cells)

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

1.3 GOVERNMENT EXPENDITURE ON R&D, by field of research(a)—2008–09

	COMMONWEALTH	STATE/TERRITORY	TOTAL
	2008–09	*2008–09*	*2008–09*
	$'000	$'000	$'000
Mathematical sciences	54 749	1 068	55 817
Physical sciences	211 087	129	211 215
Chemical sciences	129 067	2 959	132 025
Earth sciences	193 650	45 772	239 422
Environmental sciences	138 253	139 453	277 706
Biological sciences	210 299	100 837	311 136
Agricultural & veterinary sciences	131 095	413 896	544 992
Information & computing sciences	260 948	29 570	290 518
Engineering	597 031	13 731	610 762
Technology	112 979	14 128	127 107
Medical & health sciences	82 818	368 731	451 549
Built environment & design	13 864	1 575	15 439
Education	3 373	10 563	13 935
Economics	36 076	2 506	38 582
Commerce, management, tourism & services	1 958	3 143	5 101
Studies in human society	38 905	10 812	49 716
Psychology & cognitive sciences	19 035	3 389	22 424
Law & legal studies	12 474	9	12 483
Studies in creative arts & writing	124	1 558	1 682
Language, communication & culture	32	2 263	2 295
History & archaeology	4 124	2 240	6 364
Philosophy & religious studies	—	196	196
Total	**2 251 941**	**1 168 527**	**3 420 468**

— 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 24 to 26 for details.

1.4 GOVERNMENT EXPENDITURE ON R&D, by field of research(a): **proportions**—2008–09

	COMMONWEALTH	STATE/TERRITORY	TOTAL
	2008–09	*2008–09*	*2008–09*
	%	%	%
Mathematical sciences	2.4	0.1	1.6
Physical sciences	9.4	—	6.2
Chemical sciences	5.7	0.3	3.9
Earth sciences	8.6	3.9	7.0
Environmental sciences	6.1	11.9	8.1
Biological sciences	9.3	8.6	9.1
Agricultural & veterinary sciences	5.8	35.4	15.9
Information & computing sciences	11.6	2.5	8.5
Engineering	26.5	1.2	17.9
Technology	5.0	1.2	3.7
Medical & health sciences	3.7	31.6	13.2
Built environment & design	0.6	0.1	0.5
Education	0.1	0.9	0.4
Economics	1.6	0.2	1.1
Commerce, management, tourism & services	0.1	0.3	0.1
Studies in human society	1.7	0.9	1.5
Psychology & cognitive sciences	0.8	0.3	0.7
Law & legal studies	0.6	—	0.4
Studies in creative arts & writing	—	0.1	—
Language, communication & culture	—	0.2	0.1
History & archaeology	0.2	0.2	0.2
Philosophy & religious studies	—	—	—
Total	**100.0**	**100.0**	**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 24 to 26 for details.

1.5 GOVERNMENT EXPENDITURE ON R&D, by socio-economic objective(a)—2008–09

	COMMONWEALTH	STATE/TERRITORY	TOTAL
	2008–09	*2008–09*	*2008–09*
	$'000	$'000	$'000
Defence	485 783	221	486 004
Economic development			
Plant prod'n & plant primary products	106 919	156 920	263 838
Animal prod'n & animal primary products	52 217	163 652	215 869
Mineral resources (excl. energy)	74 656	29 343	103 999
Energy	139 954	9 269	149 222
Manufacturing	147 372	17 527	164 899
Construction	16 752	647	17 399
Transport	17 730	5 677	23 407
Information & communication services	146 958	9 935	156 894
Commercial services & tourism	7 730	4 982	12 712
Economic framework	47 293	3 271	50 564
Total	*757 581*	*401 223*	*1 158 804*
Society			
Health	138 199	405 469	543 668
Education & training	4 557	11 568	16 125
Law, politics & community services	163 698	16 300	179 998
Cultural understanding	5 618	9 682	15 300
Total	*312 071*	*443 020*	*755 091*
Environment	489 933	304 155	794 088
Expanding knowledge	206 574	19 907	226 481
Total	**2 251 941**	**1 168 527**	**3 420 468**

(a) Based on the 2008 edition of the ANZSRC. Previous cycle estimates are available on an ASRC basis only. See Explanatory Notes 24 to 26 for details.

1.6 GOVERNMENT EXPENDITURE ON R&D, by socio-economic objective(a): **proportions**—2008–09

	COMMONWEALTH	STATE/TERRITORY	TOTAL
	2008–09	*2008–09*	*2008–09*
	%	%	%
Defence	21.6	—	14.2
Economic development			
Plant prod'n & plant primary products	4.7	13.4	7.7
Animal prod'n & animal primary products	2.3	14.0	6.3
Mineral resources (excl. energy)	3.3	2.5	3.0
Energy	6.2	0.8	4.4
Manufacturing	6.5	1.5	4.8
Construction	0.7	0.1	0.5
Transport	0.8	0.5	0.7
Information & communication services	6.5	0.9	4.6
Commercial services & tourism	0.3	0.4	0.4
Economic framework	2.1	0.3	1.5
Total	*33.6*	*34.3*	*33.9*
Society			
Health	6.1	34.7	15.9
Education & training	0.2	1.0	0.5
Law, politics & community services	7.3	1.4	5.3
Cultural understanding	0.2	0.8	0.4
Total	*13.9*	*37.9*	*22.1*
Environment	21.8	26.0	23.2
Expanding knowledge	9.2	1.7	6.6
Total	**100.0**	**100.0**	**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 24 to 26 for details.

1.7 GOVERNMENT HUMAN RESOURCES DEVOTED TO R&D, by type of resource—2006–07 and 2008–09(a)

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2006–07(a)	*2008–09*	*2006–07*(a)	*2008–09*	*2006–07*(a)	*2008–09*
	PYE	PYE	PYE	PYE	PYE	PYE
Researchers	4 740	4 549	3 982	3 736	8 721	8 285
Technicians	2 851	3 166	2 244	2 939	5 095	6 105
Other staff	1 891	1 494	1 053	1 159	2 944	2 652
Total human resources devoted to R&D	**9 481**	**9 209**	**7 279**	**7 834**	**16 760**	**17 042**

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

1.8 GOVERNMENT HUMAN RESOURCES DEVOTED TO R&D, by type of resource: **proportions**—2006–07 and 2008–09(a)

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2006–07(a)	*2008–09*	*2006–07*(a)	*2008–09*	*2006–07*(a)	*2008–09*
	%	%	%	%	%	%
Researchers	50.0	49.4	54.7	47.7	52.0	48.6
Technicians	30.1	34.4	30.8	37.5	30.4	35.8
Other staff	19.9	16.2	14.5	14.8	17.6	15.6
Total human resources devoted to R&D	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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

CHAPTER 2 PRIVATE NON-PROFIT RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

PRIVATE NON-PROFIT RESOURCES DEVOTED TO R&D

Expenditure on R&D by Australian private non-profit (PNP) organisations during the 2008–09 financial period was $744 million. Over the same period, human resources devoted to R&D by PNP organisations represented 4,788 person years of effort (PYE).

PNP RESOURCES DEVOTED TO R&D

		1998–99	*2000–01*	*2002–03*	*2004–05*	*2006–07*	*2008–09*
Expenditure on R&D							
Current prices	$m	225	289	360	479	r609	744
Chain volume measures(a)	$m	324	387	433	545	646	744
Human resources devoted to R&D	PYE	2 551	2 791	3 117	3 845	r4 575	4 788

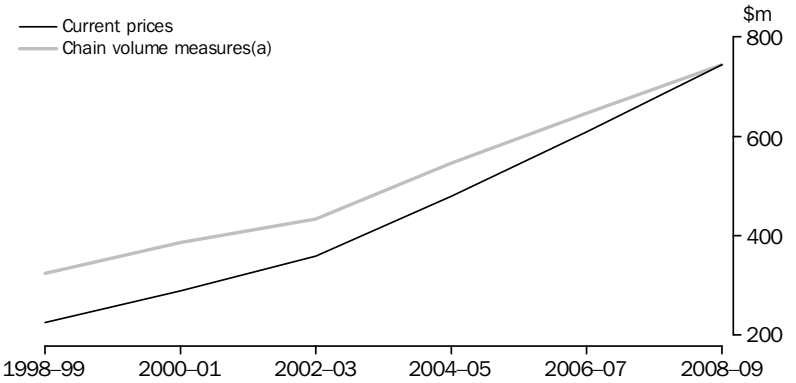
r revised

(a) The reference year for chain volume measures is 2008–09. See Explanatory Notes 30 and 31 for details.

PNP EXPENDITURE ON R&D (PNPERD)

In 2008–09, PNPERD showed an increase of 22% in current price terms and 15% in chain volume terms.

PNP EXPENDITURE ON R&D



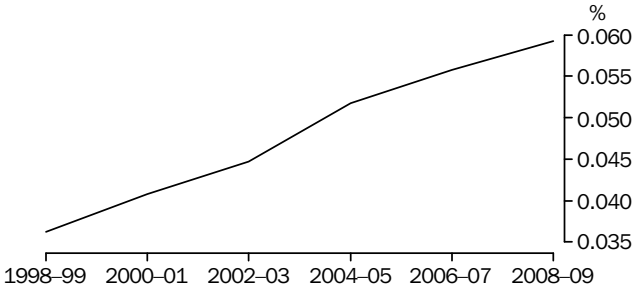
(a) The reference year for chain volume measures is 2008–09. See Explanatory Notes 30 and 31 for details.

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

PNPERD and gross domestic product (GDP)

PNPERD as a proportion of GDP remained steady at approximately 0.06% between 2006–07 and 2008–09.

PNPERD, as a proportion of GDP(a)



(a) See Explanatory Notes 28 and 29 for details.

Type of expenditure

In 2008–09, Current expenditure accounted for 88% ($653 million) of total PNPERD. Labour costs, which totalled $372 million, was the largest component of Current expenditure and represented 50% of total PNPERD.

R&D related Capital expenditure was $91 million during 2008–09. Capital expenditure on Land, buildings and other structures increased by 63% to $51 million in 2008–09, accounting for 56% of Capital expenditure compared to 42% in 2006–07.

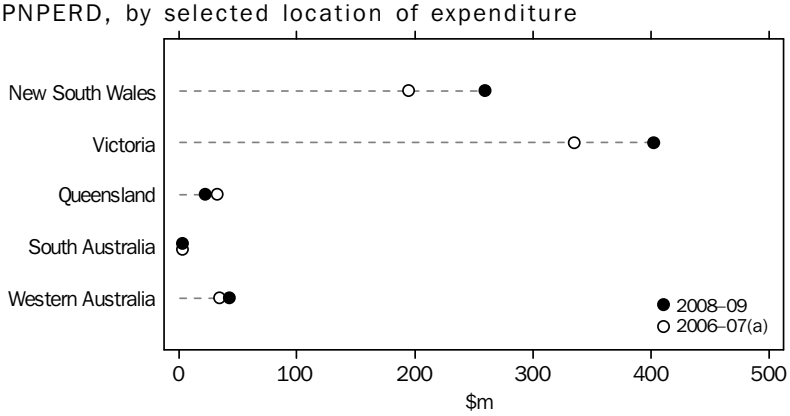
Source of funds

The main sources of funds for PNPERD in 2008–09 were Commonwealth government ($285 million or 38% of total PNPERD) and Own funds ($179 million or 24%). Of all sources of funds, Commonwealth government shows the largest dollar increase from 2006–07 (up $89 million) and the largest change in proportional share of PNPERD (up 6 percentage points).

Location of expenditure

Location of expenditure relates to the region in which R&D activity was performed; see also Explanatory Note 27. In 2008–09, almost 90% of PNPERD was in Victoria and New South Wales at $402 million (54%) and $259 million (35%), respectively. These locations also recorded the highest dollar increases in PNPERD from 2006–07, up $67 million and $65 million, respectively.

PNPERD, by selected location of expenditure



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

Location of expenditure continued

In 2008–09, PNPERD as a proportion of gross state product (GSP) was highest for Victoria at 0.13% in 2008–09, followed by NSW at 0.06%. Since 2006–07, PNPERD/GSP ratios have remained relatively stable for all states and territories.

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

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	%	%	%	%	%	%	%	%
2006–07	0.06	0.13	0.02	—	0.02	np	np	np
2008–09	0.06	0.14	0.01	—	0.03	np	np	np

— nil or rounded to zero (including null cells)
np not available for publication but included in totals where applicable, unless otherwise indicated
(a) See Explanatory Note 28 for details.

Type of activity

Almost 70% of PNPERD in 2008–09 was directed into Applied research ($261 million or 35%) and Strategic basic research ($246 million or 33%).

PNPERD directed into Experimental development in 2008–09 ($164 million) was more than double that in 2006–07. The distribution of PNPERD across types of activity in 2008–09 changed significantly from 2006–07; Experimental development showed a 10 percentage point increase in its proportional share of PNPERD (up from 12% to 22%), while Strategic basic research showed a decrease of six percentage points (down from 39% to 33%).

Field of research (FOR)

In 2008–09, PNPERD devoted to the Medical and health sciences FOR represented 75% ($559 million) of the total. This was more than four times the next highest FOR, Biological sciences (at $117 million or 16% of PNPERD).

Socio-economic objective (SEO)

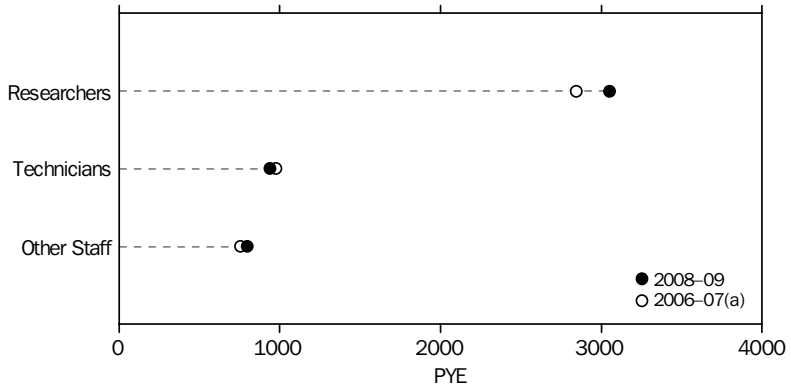
The majority (98%) of PNPERD in 2008–09 was directed into the SEO sector of Society. At $685 million, the Health division contributed 94% to the Society sector and 92% to total PNPERD.

PNP HUMAN RESOURCES DEVOTED TO R&D

PNP human resources devoted to R&D in 2008–09 increased by 5% from 2006–07. Of the 4,788 person years of effort (PYE) devoted to R&D by PNP organisations in 2008–09, 64% (3,051 PYE) was attributable to Researchers, 20% (938 PYE) to Technicians and 17% (799 PYE) to Other staff.

Both Researchers and Other staff increased from 2006–07 (up 209 and 41 PYE respectively), while Technicians showed a decrease (down 37 PYE).

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



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

2.1 PRIVATE NON-PROFIT EXPENDITURE ON R&D, summary statistics: **values and proportions**—2006–07 and 2008–09(a)

	EXPENDITURE ON R&D		PROPORTION OF TOTAL EXPENDITURE ON R&D	
	2006–07(a)	*2008–09*	*2006–07*(a)	*2008–09*
	$'000	$'000	%	%
Type of expenditure				
Capital expenditure				
Land, buildings & other structures	31 378	51 203	5.2	6.9
Other capital expenditure	43 733	39 784	7.2	5.3
Total	*75 111*	*90 987*	*12.3*	*12.2*
Current expenditure				
Labour costs	311 078	372 151	51.1	50.0
Other current expenditure	222 727	280 769	36.6	37.7
Total	*533 805*	*652 920*	*87.7*	*87.8*
Source of funds				
Own funds	157 751	179 142	25.9	24.1
Commonwealth government	195 683	284 612	32.1	38.3
State & local government	76 943	85 063	12.6	11.4
Other private non-profit organisations	43 478	47 036	7.1	6.3
Business	27 505	27 250	4.5	3.7
Joint government/business	883	910	0.1	0.1
Universities	2 058	3 914	0.3	0.5
Donations & bequests	34 974	38 421	5.7	5.2
Other Australian	7 135	317	1.2	—
Overseas	62 506	77 242	10.3	10.4
Location of expenditure				
New South Wales	194 730	259 287	32.0	34.9
Victoria	335 273	402 305	55.1	54.1
Queensland	32 627	22 218	5.4	3.0
South Australia	3 131	2 887	0.5	0.4
Western Australia	34 487	42 595	5.7	5.7
Tasmania	np	np	np	np
Northern Territory	np	np	np	np
Australian Capital Territory	np	1 129	np	0.2
Overseas	np	np	np	np
Type of activity				
Pure basic research	68 260	73 182	11.2	9.8
Strategic basic research	239 852	245 620	39.4	33.0
Applied research	225 728	261 407	37.1	35.1
Experimental development	75 076	163 698	12.3	22.0
Total expenditure on R&D	**608 916**	**743 907**	**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) 2006–07 data have been revised. Refer to the Revisions section of the Technical Note for details.

2.2 PRIVATE NON-PROFIT EXPENDITURE ON R&D, by field of research(a): **values and proportions**—2008–09

	Expenditure on R&D	*Proportion of total expenditure on R&D*
	$'000	%
Mathematical sciences	np	np
Physical sciences	—	—
Chemical sciences	np	np
Earth sciences	np	np
Environmental ciences	6 578	0.9
Biological sciences	117 259	15.8
Agricultural & veterinary sciences	961	0.1
Information & computing sciences	np	np
Engineering	np	np
Technology	6 214	0.8
Medical & health sciences	559 338	75.2
Built environment & design	np	np
Education	np	np
Economics	np	np
Commerce, management, tourism & services	np	np
Studies in human society	5 462	0.7
Psychology & cognitive sciences	6 700	0.9
Law & legal studies	np	np
Studies in creative arts & writing	np	np
Language, communication & culture	np	np
History & archaeology	—	—
Philosophy & religious studies	np	np
Total	**743 907**	**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 24 to 26 for details.

2.3 PRIVATE NON-PROFIT EXPENDITURE ON R&D, by socio-economic objective(a): values and proportions—2008–09

	Expenditure on R&D	*Proportion of total expenditure on R&D*
	$'000	%
Defence	—	—
Economic development		
Plant prod'n & plant primary products	np	np
Animal prod'n & animal primary products	np	np
Mineral resources (excl. energy)	—	—
Energy	np	np
Manufacturing	9 417	1.3
Construction	—	—
Transport	—	—
Information & communication services	—	—
Commercial services & tourism	—	—
Economic framework	318	—
Total	*10 741*	*1.4*
Society		
Health	685 258	92.1
Education & training	np	np
Law, politics & community services	5 979	0.8
Cultural understanding	np	np
Total	*725 826*	*97.6*
Environment	6 713	0.9
Expanding knowledge	627	0.1
Total	**743 907**	**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 24 to 26 for details.

2.4 PRIVATE NON-PROFIT HUMAN RESOURCES DEVOTED TO R&D, by type of resource: **values and proportions**—2006–07 and 2008–09(a)

	HUMAN RESOURCES DEVOTED TO R&D		PROPORTION OF TOTAL HUMAN RESOURCES DEVOTED TO R&D	
	2006–07(a)	*2008–09*	*2006-07*(a)	*2008-09*
	PYE	PYE	%	%
Researchers	2 842	3 051	62.1	63.7
Technicians	975	938	21.3	19.6
Other staff	758	799	16.6	16.7
Total human resources devoted to R&D	**4 575**	**4 788**	**100.0**	**100.0**

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

EXPLANATORY NOTES

INTRODUCTION

1 This release presents statistics compiled from data collected by the Australian Bureau of Statistics (ABS) from Australian government and private non-profit (PNP) organisations in the *Survey of Research and Experimental Development (R&D)*. For the government and PNP sectors, the survey is conducted biennially, via mail questionnaire, and based on a single financial year.

2 The reference period for statistics presented in this issue is the financial year ended 30 June 2009. The 2008–09 *Survey of R&D, Government and Private non-profit organisations*, achieved a response rate of 99.8%.

DEFINITIONS

3 R&D as collected by the ABS is defined in accordance with the Organisation for Economic Co-operation and Development (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 organisations is included in these data.

4 For a more comprehensive interpretation of the definition of R&D activity, see the OECD publication *The Measurement of Scientific and Technological Activities: Proposed Standard Practice for Surveys on Research and Experimental Development - Frascati Manual 2002* or refer to the *Australian and New Zealand Standard Research Classification (ANZSRC)*, 2008 (cat. no. 1297.0).

FRAME

5 The source of the frame for the *Survey of R&D, Government and Private non-profit organisations* is the ABS Business Register (ABSBR). The ABSBR records information about statistical units and is used to create the frames for most ABS economic collections.

Statistical units defined on the ABSBR

6 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 (or in the case of this survey, the government or PNP organisation).

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

8 The units model allocates businesses/organisations to one of two sub-populations. The vast majority of businesses/organisations are in what is called the Australian Taxation Office (ATO) Maintained Population (ATOMP), while the remaining businesses/organisations are in the ABS Maintained Population (ABSMP). Together these two sub-populations make up the ABSBR population.

9 Most businesses and organisations in Australia need to obtain an Australian Business Number (ABN) and are then included on the whole-of-government register of businesses, the Australian Business Register (ABR), which is maintained by the ATO. Most of these businesses/organisations have simple structures; therefore, the unit registered for an ABN will satisfy ABS statistical requirements. The businesses/organisations with simple structures constitute the ATOMP, and the ABN unit is used as the statistical unit for ABS economic collections.

Statistical units defined on the ABSBR continued

10 For the population of businesses/organisations where the ABN unit is not suitable for ABS statistical requirements, the ABS maintains its own units structure through direct contact with each business/organisation. These businesses/organisations constitute the ABSMP. This population consists typically of large, complex and diverse businesses/organisations. For businesses/organisations 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/organisation 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.

11 Statistical units for the *Survey of R&D, Government and Private non-profit organisations* consist of ABNs for the ATOMP and TAUs from the ABSMP.

12 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 the *Information Paper: Improvements in ABS Economic Statistics - Arising from the New Tax System*, (cat. no. 1372.0).

SCOPE AND COVERAGE

13 The *Survey of R&D, Government and Private non-profit organisations,* aims to be a complete enumeration of government and PNP organisations with intramural expenditure on R&D during the reference period.

14 Intramural expenditure is defined as expenditure for R&D performed by the statistical unit regardless of the source of funds. Expenditures made outside the statistical unit but in support of intramural R&D are included. For further information, refer to the OECD *Frascati Manual 2002*.

15 The ABS identifies organisations likely to have had intramural R&D expenditure in the reference period through:

- reported expenditure on R&D in the previous survey; and
- indicated expenditure on R&D via a coverage questionnaire.

16 From the 2004–05 cycle of the ABS *Survey of R&D*, the scope for the government and PNP sectors has been based on the Standard Institutional Sector Classification of Australia (SISCA); more specifically, Sector 3 (General Government) and Sector 5 (Not-for-profit Institutions Serving Households).

17 Some information about SISCA Sector 3 and Sector 5 is provided below. For further details about the ABS sector classifications, refer to *Standard Economic Sector Classifications of Australia (SESCA) 2008* (cat. no. 1218.0).

General Government sector

18 The General Government sector comprises all government units of the Australian Government, each state and territory government, and all local government authorities, and all resident non-market Not-for-profit Institutions (NPIs) that are controlled and mainly financed by those governments. It includes courts, government departments, the Governor General's office, and public universities.

19 Government entities mainly engaged in market production or financial activities are not included in the General Government sector.

NPIs Serving Households sector

20 The NPIs Serving Households sector consists of resident non-market operators providing goods and services to households free or at prices that are not economically significant. It includes NPIs that are mainly financed from household member subscriptions and produce benefits primarily for the household members and NPIs created for philanthropic purposes which are financed mainly from donations or government grants.

21 NPIs engaged in market production are not included in the NPIs Serving Households sector.

Survey exclusions

22 While the government and PNP sectors for the *Survey of R&D* are based on SISCA, as per the *Frascati Manual* guidelines, the survey excludes:

- Higher education institutions, e.g. universities (which are included in the ABS *Survey of R&D, Higher education organisations*).

23 Local government organisations are also excluded from the survey, as they are considered by the ABS to have low R&D expenditure.

AUSTRALIAN AND NEW ZEALAND STANDARD RESEARCH CLASSIFICATION

24 Field of research (FOR), Socio-economic objective (SEO) 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).

25 Due to differences between the two classifications, implementation of the ANZSRC represents a break in series. Users should familiarise themselves with the differences if attempting to compare data across reference periods, particularly FOR and SEO estimates.

26 The ABS has not compiled previous cycle estimates on an ANZSRC basis or 2008–09 estimates on an ASRC basis. Previous cycle data compiled on an ASRC basis (including revised data for 2006–07) are available in the data cubes accompanying this release.

LOCATION OF EXPENDITURE

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

GROSS DOMESTIC PRODUCT (GDP) AND GROSS STATE PRODUCT (GSP)

28 The most recent GDP and GSP values available were used to calculate the R&D expenditure/GDP and R&D expenditure/GSP ratios presented in this issue. These values are referenced in the tables below.

GROSS DOMESTIC PRODUCT, current prices

	1998-99	*2000-01*	*2002-03*	*2004-05*	*2006-07*	*2008-09*
	$m	$m	$m	$m	$m	$m
GDP	622 695	708 889	804 361	925 864	1 091 327	1 256 118

Source: Australian National Accounts: National Income, Expenditure and Product, Mar 2010 (cat. no. 5206.0), released 2 June 2010

GROSS STATE PRODUCT, current prices

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	$m	$m	$m	$m	$m	$m	$m	$m
2006–07	352 162	261 200	209 173	71 725	138 688	21 249	14 339	22 791
2008–09	402 334	291 637	243 901	78 986	169 950	23 176	17 168	25 969

Source: Australian National Accounts, State Accounts, 2008–09 (cat. no. 5220.0). Reissue released 22 December 2009

29 GDP is estimated by the ABS according to the recently updated international standards *System of National Accounts, 2008* (2008 SNA) and is not directly comparable to GDP for countries where these standards have not been applied.

CHAIN VOLUME MEASURES

30 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 2008–09). 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

CHAIN VOLUME MEASURES *continued*

series. They are formed in a multi-stage process of which the major steps are described in Section 15 of the *Information Paper: Australian National Accounts, Introduction of Chain Volume and Price Indexes* (cat. no. 5248.0).

31 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 is the first issue of this release to present chain volume estimates calculated using the revised deflators.

UPCOMING RELEASES

32 Upcoming ABS releases of R&D statistics include:

Research and Experimental Development, Businesses, Australia, 2008–09 (cat. no. 8104.0), to be released 23 September 2010

Research and Experimental Development, All Sector Summary, Australia, 2008–09 (cat. no. 8112.0), to be released 11 October 2010

OTHER RELATED RELEASES

33 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)

Microdata: Business Longitudinal Database, Expanded CURF, Australia, 2004–05, 2005–06 and 2006–07 (cat. no. 8168.0.55.001)

Research and Experimental Development, Higher Education Organisations, Australia, 2008 (cat. no. 8111.0)

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

Summary of IT Use and Innovation in Australian Business, 2008–09 (cat. no. 8166.0)

34 Relevant OECD publications include:

Main Science and Technology Indicators 2009/2

The Measurement of Scientific and Technological Activities: Proposed Standard Practice for Surveys of Research and Experimental Development - Frascati Manual 2002

ABS WEBSITE

35 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 theme page under Topics @ a Glance/Industry.

ROUNDING

36 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 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 organisations provided estimates due to a lack of separately recorded data on R&D activity. This was most prevalent for government organisations without a specific research focus.
- Data were self-classified by organisations to Field of research, Socio-economic objective and Type of activity, at the time of reporting. Some organisations may have experienced difficulty in classifying their R&D projects. The ABS makes every effort to ensure correct and consistent interpretation and reporting of these data by applying consistent processing methodologies.
- The estimation method for R&D related overhead costs varied across organisations and reference periods.

REVISIONS

4 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 the previous cycle (details are collected and used to revise previously released estimates).

5 Revisions are only applied to previous cycle data 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.

6 In processing 2008–09 data, revisions were applied to 2006–07 estimates. Revisions were primarily the result of: provider reassessment of application of definitions and classifications; and newly identified R&D performers. The effect of revisions is most noticeable in component item data.

7 Users are advised to refer to the most recently released data cubes, as revisions 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.
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 and 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/organisation performed the R&D. This may not be the head office location of the business/organisation.
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 organisation; commission and consultant expenses for research projects carried out by the organisation (except direct labour costs); software for own account produced as part of R&D; and the proportion of expenditure on general services and overheads which is attributable to R&D activity.
Other staff	Skilled and unskilled craftpersons, secretarial and clerical staff directly involved in 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/organisation) on behalf of the related entity.

Overseas location Includes R&D performed overseas, but controlled by the Australian business/organisation. 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 Australian business/organisation.

Person years of effort (PYE) 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 into 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.

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