



2011–12

8109.0

RESEARCH AND EXPERIMENTAL DEVELOPMENT

AUSTRALIA

GOVERNMENT AND PRIVATE NON-PROFIT ORGANISATIONS

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C O N T E N T S

	<i>page</i>
Notes	2
List of tables	3
Abbreviations	4

CHAPTERS

1 Government Research and Experimental Development (R&D)	5
2 Private Non-Profit Research and Experimental Development (R&D)	17

ADDITIONAL INFORMATION

Explanatory Notes	25
Technical Note	29
Glossary	30

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 Amanda Baile on Perth (08) 9360 5357.

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 2012. 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

The 2010–11 *Survey of Research and Experimental Development, Government and Private Non-Profit Organisations* was deferred for a year and conducted for the 2011–12 financial year. The survey will be undertaken again for 2012–13, before returning to a biennial (two-yearly) collection frequency.

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

CHANGES IN THIS ISSUE

Fields of Research and Socio-economic Objective data presented in this issue have been collected using the Australian and New Zealand Standard Research Classification (ANZSRC) at the group level (4 digit) only rather than field level (6 digit). Production of outputs at the 6 digit level, previously available upon request, is no longer possible.

For more information on this classification please refer to the *Australian and New Zealand Standard Research Classification (ANZSRC), 2008* (cat. no. 1297.0).

The time series data available in data cubes have been revised. The industry and employment size data cubes have been ceased for the Government sector, and the industry data cubes have been ceased for the Private non-profit sector.

FUTURE CHANGES

A further reduction in the level of detail collected using the Australian and New Zealand Standard Research Classification (ANZSRC) for Fields of Research and Socio-economic Objective will take place in 2012–13. Outputs from 2012–13 will only be available at the division level (2 digit).

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.

Brian Pink
Australian Statistician

LIST OF TABLES

page

GOVERNMENT RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

1.1	Government expenditure on R&D, summary statistics	10
1.2	Government expenditure on R&D, summary statistics: proportions	11
1.3	Government expenditure on R&D, by fields of research	12
1.4	Government expenditure on R&D, by fields of research: proportions	13
1.5	Government expenditure on R&D, by socio-economic objective	14
1.6	Government expenditure on R&D, by socio-economic objective: proportions	15
1.7	Government human resources devoted to R&D, by type of resource	16
1.8	Government human resources devoted to R&D, by type of resource: proportions	16

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

2.1	Private non-profit expenditure on R&D, summary statistics: values and proportions	21
2.2	Private non-profit expenditure on R&D, by fields of research: values and proportions	22
2.3	Private non-profit expenditure on R&D, by socio-economic objective: values and proportions	23
2.4	Private non-profit human resources devoted to R&D, by type of resource: values and proportions	24

ABBREVIATIONS

\$'000	thousand dollars
\$m	million dollars
ABN	Australian Business Number
ABR	Australian Business Register
ABS	Australian Bureau of Statistics
ABSBR	Australian Bureau of Statistics Business Register
ABSMP	Australian Bureau of Statistics maintained population
ACT	Australian Capital Territory
ANZSRC	Australian and New Zealand Standard Research Classification
ATO	Australian Taxation Office
ATOMP	Australian Taxation Office maintained population
Aust.	Australia
excl.	excluding
FOR	Fields of Research
GDP	gross domestic product
GOVERD	government expenditure on R&D
GSP	gross state product
NPI	not for profit institution
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
SESCA	Standard Economic Sector Classification of Australia
SISCA	Standard Institutional Sector Classification of Australia
SNA	System of National Accounts
Tas.	Tasmania
TAU	type of activity unit
TNTS	The New Tax System
Vic.	Victoria
WA	Western Australia

CHAPTER 1

GOVERNMENT RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

GOVERNMENT RESOURCES DEVOTED TO R&D

During the 2011–12 financial year, expenditure on R&D performed by Australian government organisations was \$3,533 million. Over the same period, human resources devoted to R&D by these organisations represented 16,760 person years of effort (PYE).

GOVERNMENT RESOURCES DEVOTED TO R&D

		2000-01	2002-03	2004-05	2006-07	2008-09	2011-12
Expenditure on R&D – Current prices							
Commonwealth	\$m	1 405	1 531	1 544	2 046	2 252	2 405
State/territory	\$m	951	951	942	1 049	1 169	1 128
<i>Total</i>	\$m	2 356	2 482	2 486	3 095	3 420	3 533
Expenditure on R&D – Chain volume measures (a)							
Commonwealth	\$m	2 049	2 131	1 871	2 298	2 383	2 405
State/territory	\$m	1 387	1 323	1 141	1 179	1 237	1 128
<i>Total</i>	\$m	3 437	3 455	3 012	3 476	3 620	3 533
Human resources devoted to R&D							
Commonwealth	PYE	9 565	10 185	9 368	9 481	9 209	9 691
State/territory	PYE	8 587	8 357	7 320	7 279	7 834	7 070
<i>Total</i>	PYE	18 151	18 542	16 687	16 760	17 042	16 760

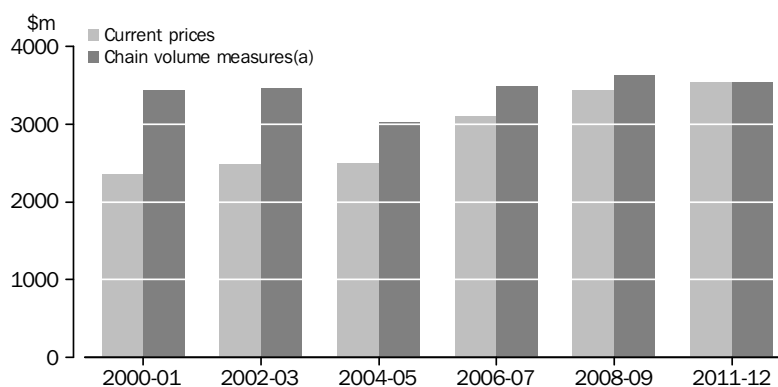
(a) The reference year for chain volume measures is 2011–12. See Explanatory Notes 30 and 31 for details.

Commonwealth government organisations contributed 68% (\$2,405 million) to total government expenditure on R&D (GOVERD) and 58% (9,691 PYE) of total human resources devoted to government R&D in 2011–12. This compares to contributions of 32% (\$1,128 million) and 42% (7,070 PYE), respectively, by State and territory government organisations.

GOVERNMENT EXPENDITURE ON R&D (GOVERD)

In 2011–12, GOVERD showed an increase of 3% in current price terms from 2008–09. Conversely, it decreased by 2% in chain volume terms.

GOVERNMENT EXPENDITURE ON R&D



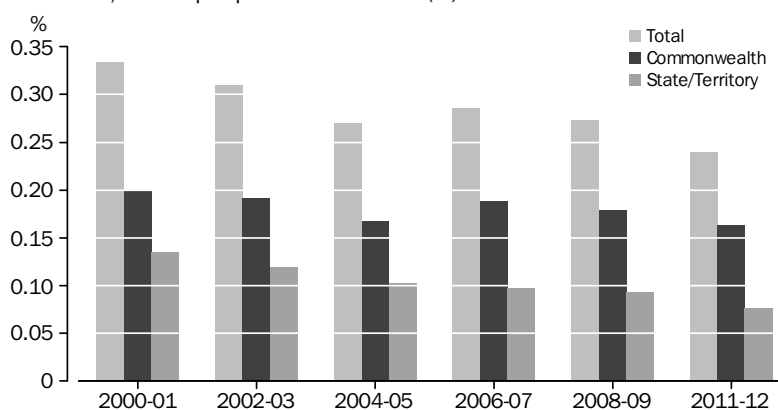
(a) The reference year for chain volume measures is 2011–12. See Explanatory Notes 30 and 31 for details.

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 0.27% in 2008–09 to 0.24% in 2011–12. Over the same period, the Commonwealth government showed a decrease of 0.02 percentage points, and the State and territory government also showed a decrease 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.

Type of expenditure

In 2011–12, GOVERD comprised of \$3,097 million in Current expenditure and \$436 million in Capital expenditure. The largest component of Current expenditure and GOVERD was Labour costs, at \$1,783 million (58% of Current expenditure and 50% of total GOVERD).

Of all types of expenditure components, capital expenditure on Land, buildings and other structures showed the largest percentage increase (11%) from 2008–09, however it remained the lowest dollar value contributor to total GOVERD (at \$181 million or 5% of total GOVERD).

Source of funds

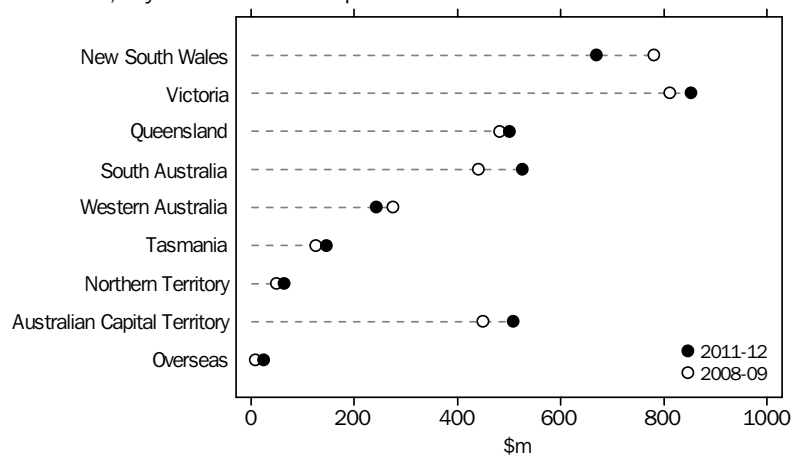
Consistent with previous survey years, the majority of GOVERD in 2011–12 was sourced from Own funds at \$2,351 million (or 66%). The second largest source of R&D funds in 2011–12 was Other Commonwealth government at \$524 million (or 15% of GOVERD).

Location of expenditure

Location of expenditure relates to the region in which R&D activity was performed; see also Explanatory Note 27. Combined GOVERD in Victoria (\$852 million) and New South Wales (\$852 million) accounted for 43% of total GOVERD in 2011–12. R&D performed in South Australia was the next largest contributor (\$526 million) showing an increase of 19% in R&D activity compared to 2008–09.

In 2011–12, while New South Wales remained as the second largest contributor to R&D expenditure by location, it also recorded the largest decrease in dollar terms (down \$111 million or 14%).

GOVERD, by location of expenditure



*Location of expenditure
continued*

In 2011–12, GOVERD as a proportion of Gross State Product (GSP) showed increases for South Australia, Tasmania and Northern Territory from 2008–09. Queensland remained steady while GOVERD/GSP ratios for all other locations showed decreases from 2008–09, with the Australian Capital Territory recording the largest decrease (down 0.15 percentage points).

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

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
	%	%	%	%	%	%	%	%
2008–09								
Commonwealth	0.12	0.20	0.07	0.39	0.08	0.54	0.20	1.67
State/territory	0.08	0.09	0.11	0.17	0.08	0.03	0.10	0.05
<i>Total</i>	<i>0.20</i>	<i>0.29</i>	<i>0.19</i>	<i>0.55</i>	<i>0.16</i>	<i>0.57</i>	<i>0.29</i>	<i>1.72</i>
2011–12								
Commonwealth	0.09	0.18	0.08	0.42	0.05	0.54	0.24	1.53
State/territory	0.06	0.08	0.09	0.15	0.05	0.07	0.11	0.05
<i>Total</i>	<i>0.15</i>	<i>0.26</i>	<i>0.18</i>	<i>0.57</i>	<i>0.10</i>	<i>0.60</i>	<i>0.34</i>	<i>1.57</i>

(a) See Explanatory Note 28 for details.

Type of activity

The distribution of GOVERD across types of activity in 2011–12 remained largely unchanged from 2008–09. As observed for 2008–09, more than half of GOVERD was directed into Applied research (56% or \$1,977 million in 2011–12) and a quarter into Strategic basic research (25% or \$896 million in 2011–12). Compared to 2008–09, an increase was recorded for Pure basic research (up 15%) from \$144 million in 2008–09 to \$165 million in 2011–12.

Fields of Research (FOR)

The FORs attracting the largest amounts of GOVERD in 2011–12 were Agricultural and veterinary sciences (\$570 million), Engineering (\$536 million), and Medical and health sciences (\$483 million). These three FORs accounted for 16%, 15% and 14% of total GOVERD, respectively.

*Socio-economic Objective
(SEO)*

In 2011–12, more than half (59%) of GOVERD was directed to the SEO sectors of Economic development (\$1,277 million or 36%) and Society (\$799 million or 23%).

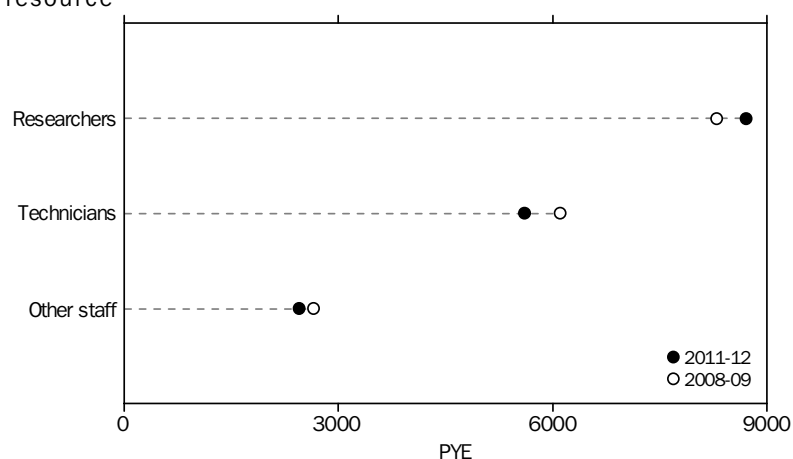
At the SEO division level, Health (\$694 million or 20%), Environment (\$669 million or 19%) and Defence (\$599 million or 17%) were the divisions attracting the largest amounts of GOVERD in 2011–12.

GOVERNMENT HUMAN RESOURCES DEVOTED TO R&D

Government human resources devoted to R&D in 2011–12 decreased by 2%, or 282 person years of effort (PYE), from 2008–09. This decrease was due to combined decreases in PYE for Technicians (down 8% or 499 PYE) and Other staff (also down 8% or 202 PYE).

In contrast, Researchers showed an increase of 5% or 419 PYE from 2008–09. Researchers remained the highest contributing type of human resource in 2011–12, accounting for 52% of total effort devoted to R&D compared to 49% in 2008–09.

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



1.1 GOVERNMENT EXPENDITURE ON R&D, summary statistics

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Type of expenditure						
Capital expenditure						
Land, buildings and other structures	91 693	104 130	71 412	76 694	163 105	180 824
Other capital expenditure	197 929	220 357	41 352	34 436	239 281	254 793
<i>Total</i>	289 622	324 487	112 764	111 130	402 386	435 617
Current expenditure						
Labour costs	1 098 115	1 190 735	592 364	592 311	1 690 479	1 783 046
Other current expenditure	864 204	889 743	463 399	424 557	1 327 603	1 314 300
<i>Total</i>	1 962 319	2 080 478	1 055 763	1 016 868	3 018 082	3 097 346
Source of funds						
Own funds	1 658 907	1 784 513	628 304	566 039	2 287 211	2 350 552
Other Commonwealth government	297 037	352 242	151 597	171 610	448 634	523 852
Other State and local government	67 439	69 929	100 042	83 590	167 481	153 519
Private non-profit organisations	14 802	5 756	74 334	71 249	89 136	77 005
Business	107 616	54 474	65 877	73 270	173 493	127 744
Joint business/government	42 876	2 833	123 275	121 166	166 151	123 999
Universities	15 308	63	5 469	8 982	20 777	9 045
Donations and bequests	—	—	1 426	10 892	1 426	10 892
Other Australian	43	1 263	465	9 625	508	10 888
Overseas	47 913	133 892	17 738	11 575	65 651	145 467
Location of expenditure						
New South Wales	469 506	394 869	310 897	274 188	780 403	669 058
Victoria	554 501	585 536	256 856	266 453	811 357	851 989
Queensland	192 762	241 030	288 010	259 961	480 771	500 991
South Australia	308 136	385 502	132 621	140 661	440 758	526 163
Western Australia	136 649	112 537	137 955	129 901	274 605	242 438
Tasmania	118 523	129 809	6 759	15 879	125 282	145 688
Northern Territory	32 748	44 325	16 243	20 050	48 990	64 375
Australian Capital Territory	435 524	492 095	13 469	15 178	448 993	507 273
Overseas	3 592	19 262	5 717	5 728	9 309	24 989
Type of activity						
Pure basic research	94 682	117 760	49 080	46 929	143 762	164 689
Strategic basic research	577 684	551 402	314 484	344 664	892 168	896 066
Applied research	1 241 936	1 383 948	671 534	593 520	1 913 470	1 977 468
Experimental development	337 639	351 856	133 429	142 885	471 068	494 740
Total expenditure on R&D	2 251 941	2 404 965	1 168 527	1 127 998	3 420 468	3 532 963

— nil or rounded to zero (including null cells)

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

1.2**GOVERNMENT EXPENDITURE ON R&D, summary statistics: proportions**

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	%	%	%	%	%	%
Type of expenditure						
Capital expenditure						
Land, buildings and other structures	4.1	4.3	6.1	6.8	4.8	5.1
Other capital expenditure	8.8	9.2	3.5	3.1	7.0	7.2
<i>Total</i>	<i>12.9</i>	<i>13.5</i>	<i>9.7</i>	<i>9.9</i>	<i>11.8</i>	<i>12.3</i>
Current expenditure						
Labour costs	48.8	49.5	50.7	52.5	49.4	50.5
Other current expenditure	38.4	37.0	39.7	37.6	38.8	37.2
<i>Total</i>	<i>87.1</i>	<i>86.5</i>	<i>90.3</i>	<i>90.1</i>	<i>88.2</i>	<i>87.7</i>
Source of funds						
Own funds	73.7	74.2	53.8	50.2	66.9	66.5
Other Commonwealth government	13.2	14.6	13.0	15.2	13.1	14.8
Other State and local government	3.0	2.9	8.6	7.4	4.9	4.3
Private non-profit organisations	0.7	0.2	6.4	6.3	2.6	2.2
Business	4.8	2.3	5.6	6.5	5.1	3.6
Joint business/government	1.9	0.1	10.5	10.7	4.9	3.5
Universities	0.7	—	0.5	0.8	0.6	0.3
Donations and bequests	—	—	0.1	1.0	—	0.3
Other Australian	—	0.1	—	0.9	—	0.3
Overseas	2.1	5.6	1.5	1.0	1.9	4.1
Location of expenditure						
New South Wales	20.8	16.4	26.6	24.3	22.8	18.9
Victoria	24.6	24.3	22.0	23.6	23.7	24.1
Queensland	8.6	10.0	24.6	23.0	14.1	14.2
South Australia	13.7	16.0	11.3	12.5	12.9	14.9
Western Australia	6.1	4.7	11.8	11.5	8.0	6.9
Tasmania	5.3	5.4	0.6	1.4	3.7	4.1
Northern Territory	1.5	1.8	1.4	1.8	1.4	1.8
Australian Capital Territory	19.3	20.5	1.2	1.3	13.1	14.4
Overseas	0.2	0.8	0.5	0.5	0.3	0.7
Type of activity						
Pure basic research	4.2	4.9	4.2	4.2	4.2	4.7
Strategic basic research	25.7	22.9	26.9	30.6	26.1	25.4
Applied research	55.1	57.5	57.5	52.6	55.9	56.0
Experimental development	15.0	14.6	11.4	12.7	13.8	14.0
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) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

1.3 GOVERNMENT EXPENDITURE ON R&D, by fields of research

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Mathematical Sciences	54 749	53 637	1 068	233	55 817	53 870
Physical Sciences	211 087	237 565	129	322	211 215	237 888
Chemical Sciences	129 067	161 103	2 959	3 521	132 025	164 623
Earth Sciences	193 650	168 481	45 772	38 682	239 422	207 163
Environmental Sciences	138 253	150 833	139 453	96 437	277 706	247 270
Biological Sciences	210 299	250 633	100 837	113 179	311 136	363 813
Agricultural and Veterinary Sciences	131 095	176 825	413 896	393 275	544 992	570 100
Information and Computing Sciences	260 948	315 708	29 570	8 596	290 518	324 305
Engineering	597 031	520 028	13 731	15 765	610 762	535 793
Technology	112 979	104 441	14 128	10 375	127 107	114 817
Medical and Health Sciences	82 818	94 866	368 731	388 450	451 549	483 316
Built Environment and Design	13 864	42 283	1 575	2 264	15 439	44 547
Education	3 373	4 902	10 563	19 770	13 935	24 672
Economics	36 076	52 910	2 506	2 350	38 582	55 260
Commerce, Management, Tourism and Services	1 958	2 292	3 143	2 789	5 101	5 081
Studies in Human Society	38 905	43 491	10 812	16 386	49 716	59 877
Psychology and Cognitive Sciences	19 035	16 785	3 389	4 263	22 424	21 048
Law and Legal Studies	12 474	2 270	9	—	12 483	2 270
Studies in Creative Arts and Writing	124	217	1 558	3 276	1 682	3 493
Language, Communication and Culture	32	—	2 263	2 492	2 295	2 492
History and Archaeology	4 124	5 347	2 240	5 438	6 364	10 786
Philosophy and Religious Studies	—	349	196	132	196	481
Total	2 251 941	2 404 965	1 168 527	1 127 998	3 420 468	3 532 963

— nil or rounded to zero (including null cells)

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

1.4**GOVERNMENT EXPENDITURE ON R&D, by fields of research: proportions**

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	%	%	%	%	%	%
Mathematical Sciences	2.4	2.2	0.1	—	1.6	1.5
Physical Sciences	9.4	9.9	—	—	6.2	6.7
Chemical Sciences	5.7	6.7	0.3	0.3	3.9	4.7
Earth Sciences	8.6	7.0	3.9	3.4	7.0	5.9
Environmental Sciences	6.1	6.3	11.9	8.5	8.1	7.0
Biological Sciences	9.3	10.4	8.6	10.0	9.1	10.3
Agricultural and Veterinary Sciences	5.8	7.4	35.4	34.9	15.9	16.1
Information and Computing Sciences	11.6	13.1	2.5	0.8	8.5	9.2
Engineering	26.5	21.6	1.2	1.4	17.9	15.2
Technology	5.0	4.3	1.2	0.9	3.7	3.2
Medical and Health Sciences	3.7	3.9	31.6	34.4	13.2	13.7
Built Environment and Design	0.6	1.8	0.1	0.2	0.5	1.3
Education	0.1	0.2	0.9	1.8	0.4	0.7
Economics	1.6	2.2	0.2	0.2	1.1	1.6
Commerce, Management, Tourism and Services	0.1	0.1	0.3	0.2	0.1	0.1
Studies in Human Society	1.7	1.8	0.9	1.5	1.5	1.7
Psychology and Cognitive Sciences	0.8	0.7	0.3	0.4	0.7	0.6
Law and Legal Studies	0.6	0.1	—	—	0.4	0.1
Studies in Creative Arts and Writing	—	—	0.1	0.3	—	0.1
Language, Communication and Culture	—	—	0.2	0.2	0.1	0.1
History and Archaeology	0.2	0.2	0.2	0.5	0.2	0.3
Philosophy and Religious Studies	—	—	—	—	—	—
Total	100.0	100.0	100.0	100.0	100.0	100.0

— nil or rounded to zero (including null cells)

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

1.5 GOVERNMENT EXPENDITURE ON R&D, by socio-economic objective

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Defence	485 783	598 797	221	—	486 004	598 797
Economic Development						
Plant Production and Plant Primary Products	106 919	121 143	156 920	188 934	263 838	310 077
Animal Production and Animal Primary Products	52 217	98 046	163 652	154 848	215 869	252 894
Mineral Resources (Excl. Energy Resources)	74 656	121 062	29 343	17 415	103 999	138 477
Energy	139 954	181 872	9 269	8 030	149 222	189 902
Manufacturing	147 372	108 110	17 527	5 674	164 899	113 784
Construction	16 752	35 614	647	4 820	17 399	40 435
Transport	17 730	32 049	5 677	7 461	23 407	39 510
Information and Communication Services	146 958	105 360	9 935	1 200	156 894	106 560
Commercial Services and Tourism	7 730	4 188	4 982	1 736	12 712	5 924
Economic Framework	47 293	76 203	3 271	2 843	50 564	79 046
<i>Total</i>	<i>757 581</i>	<i>883 647</i>	<i>401 223</i>	<i>392 962</i>	<i>1 158 804</i>	<i>1 276 609</i>
Society						
Health	138 199	264 706	405 469	429 323	543 668	694 029
Education and Training	4 557	12 626	11 568	21 952	16 125	34 578
Law, Politics and Community Services	163 698	31 375	16 300	16 413	179 998	47 788
Cultural Understanding	5 618	8 340	9 682	14 294	15 300	22 634
<i>Total</i>	<i>312 071</i>	<i>317 046</i>	<i>443 020</i>	<i>481 982</i>	<i>755 091</i>	<i>799 029</i>
Environment	489 933	438 573	304 155	230 486	794 088	669 059
Expanding Knowledge	206 574	166 901	19 907	22 568	226 481	189 469
Total	2 251 941	2 404 965	1 168 527	1 127 998	3 420 468	3 532 963

— nil or rounded to zero (including null cells)

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

1.6**GOVERNMENT EXPENDITURE ON R&D, by socio-economic objective: proportions**

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	%	%	%	%	%	%
Defence	21.6	24.9	—	—	14.2	16.9
Economic Development						
Plant Production and Plant Primary Products	4.7	5.0	13.4	16.7	7.7	8.8
Animal Production and Animal Primary Products	2.3	4.1	14.0	13.7	6.3	7.2
Mineral Resources (Excl. Energy Resources)	3.3	5.0	2.5	1.5	3.0	3.9
Energy	6.2	7.6	0.8	0.7	4.4	5.4
Manufacturing	6.5	4.5	1.5	0.5	4.8	3.2
Construction	0.7	1.5	0.1	0.4	0.5	1.1
Transport	0.8	1.3	0.5	0.7	0.7	1.1
Information and Communication Services	6.5	4.4	0.9	0.1	4.6	3.0
Commercial Services and Tourism	0.3	0.2	0.4	0.2	0.4	0.2
Economic Framework	2.1	3.2	0.3	0.3	1.5	2.2
<i>Total</i>	33.6	36.7	34.3	34.8	33.9	36.1
Society						
Health	6.1	11.0	34.7	38.1	15.9	19.6
Education and Training	0.2	0.5	1.0	1.9	0.5	1.0
Law, Politics and Community Services	7.3	1.3	1.4	1.5	5.3	1.4
Cultural Understanding	0.2	0.3	0.8	1.3	0.4	0.6
<i>Total</i>	13.9	13.2	37.9	42.7	22.1	22.6
Environment	21.8	18.2	26.0	20.4	23.2	18.9
Expanding Knowledge	9.2	6.9	1.7	2.0	6.6	5.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

— nil or rounded to zero (including null cells)

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

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

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	PYE	PYE	PYE	PYE	PYE	PYE
Researchers	4 549	5 215	3 736	3 488	8 285	8 704
Technicians	3 166	3 033	2 939	2 574	6 105	5 606
Other staff	1 494	1 442	1 159	1 008	2 653	2 450
Total human resources devoted to R&D	9 209	9 691	7 834	7 070	17 042	16 760

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

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

	COMMONWEALTH		STATE/TERRITORY		TOTAL	
	2008-09	2011-12(a)	2008-09	2011-12(a)	2008-09	2011-12(a)
	%	%	%	%	%	%
Researchers	49.4	53.8	47.7	49.3	48.6	51.9
Technicians	34.4	31.3	37.5	36.4	35.8	33.5
Other staff	16.2	14.9	14.8	14.3	15.6	14.6
Total human resources devoted to R&D	100.0	100.0	100.0	100.0	100.0	100.0

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 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 performed by Australian private non-profit (PNP) organisations during the 2011–12 financial year was \$925 million. Over the same period, human resources devoted to R&D by PNP organisations represented 5,183 person years of effort (PYE).

PNP RESOURCES DEVOTED TO R&D

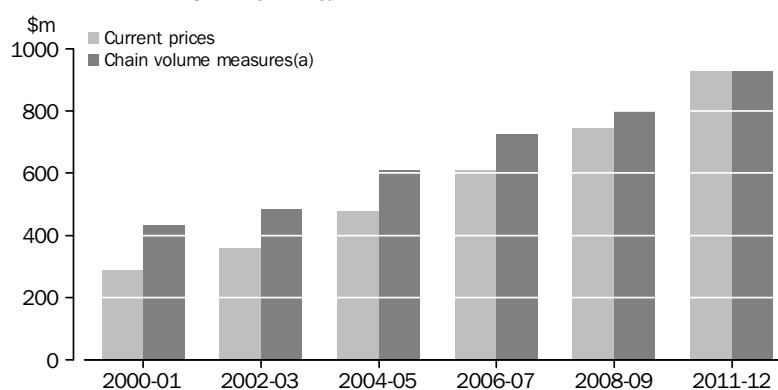
		2000–01	2002–03	2004–05	2006–07	2008–09	2011–12
Expenditure on R&D							
Current prices	\$m	289	360	479	609	744	925
Chain volume measures(a)	\$m	433	485	611	724	796	925
Human resources devoted to R&D							
	PYE	2 791	3 117	3 845	4 575	4 788	5 183

(a) The reference year for chain volume measures is 2011–12. See Explanatory Notes 30 and 31 for details.

PNP EXPENDITURE ON R&D (PNPERD)

In 2011–12, PNPERD showed an increase of 24% in current price terms and 16% in chain volume terms.

PNP EXPENDITURE ON R&D

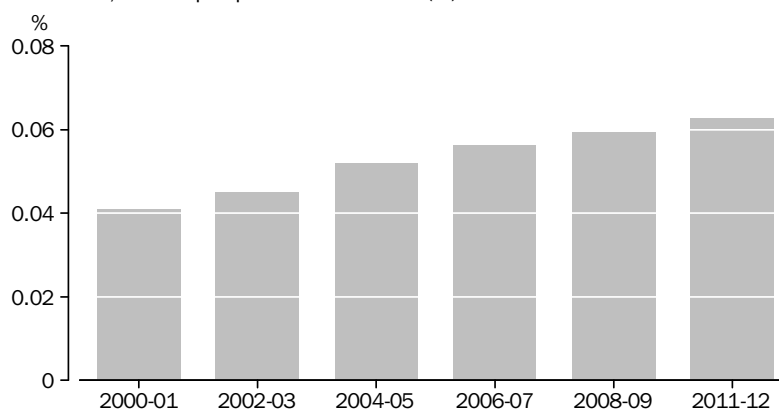


(a) The reference year for chain volume measure is 2011–12. See Explanatory Notes 30 and 31 for details.

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

PNP EXPENDITURE ON
R&D (PNPERD)
continued

PNPERD, as a proportion of GDP(a)



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

*PNPERD and Gross
Domestic Product (GDP)*

PNPERD as a proportion of GDP remained steady at approximately 0.06% between 2008–09 and 2011–12.

Type of expenditure

In 2011–12, Current expenditure accounted for 91% (\$840 million) of total PNPERD. As in 2008–09, Labour costs was the largest component of Current expenditure (\$447 million) and represented 48% of total PNPERD. R&D related Capital expenditure amounted to \$85 million during 2011–12.

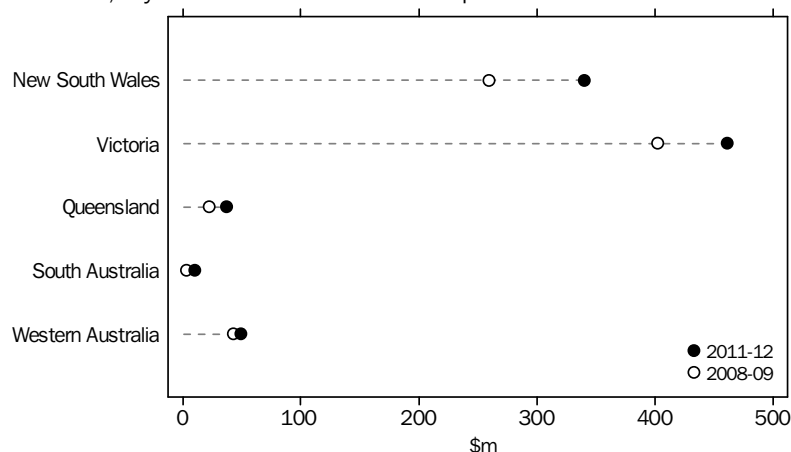
Source of funds

The main sources of funds for PNPERD in 2011–12 were Commonwealth government (\$324 million or 35% of total PNPERD) and Own funds (\$248 million or 27%). Of all sources of funds, Own funds showed the largest dollar increase from 2008–09 (up \$69 million) followed by Other private non-profit organisations (up \$51 million) in 2011–12.

Location of expenditure

Location of expenditure relates to the region in which R&D activity was performed; see also Explanatory Note 27. In 2011–12, Victoria and New South Wales accounted for 87% of PNPERD with \$461 million (50%) and \$340 million (37%), respectively. These locations also recorded the highest dollar increases in PNPERD from 2008–09, up \$59 million and \$81 million, respectively.

PNPERD, by selected location of expenditure



In 2011–12, PNPERD as a proportion of Gross State Product (GSP) was highest for Victoria at 0.14%, followed by New South Wales at 0.07%. Since 2008–09, 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
	%	%	%	%	%	%	%	%
2008–09	0.07	0.14	—	—	0.02	np	np	np
2011–12	0.07	0.14	0.01	0.01	0.02	—	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

In 2011–12, 68% of PNPERD was directed into Applied research (\$320 million or 35%) and Strategic basic research (\$312 million or 34%). The distribution of PNPERD across types of activity in 2011–12 remained largely unchanged from 2008–09.

Fields of Research (FOR)

Medical and health sciences FOR attracted 81% (\$749 million) of the total PNPERD in 2011–12. The next highest FOR, Biological sciences (at \$90 million) represented only 10% of PNPERD in 2011–12.

Socio-economic Objective (SEO)

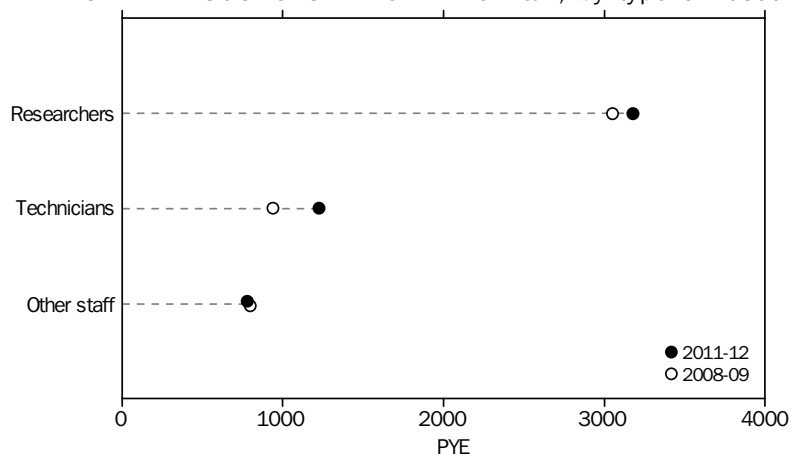
As in 2008–09, the majority of PNPERD (97%) was directed into the SEO sector of Society in 2011–12. At \$828 million, the Health division contributed 93% to the Society sector and 90% to total PNPERD.

PNP HUMAN RESOURCES DEVOTED TO R&D

PNP human resources devoted to R&D in 2011–12 increased by 8% from 2008–09. Of the 5,183 person years of effort (PYE) devoted to R&D by PNP organisations in 2011–12, 3,178 PYE (61%) was attributable to Researchers, 1,227 PYE (24%) to Technicians and 778 PYE (15%) to Other staff.

This increase was mainly driven by an increase in PYE for Technicians (up 289 PYE or 31%) in 2011–12.

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



2.1**PRIVATE NON-PROFIT EXPENDITURE ON R&D, summary statistics: values and proportions**

	EXPENDITURE ON R&D		PROPORTION OF TOTAL EXPENDITURE ON R&D	
	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	%	%
Type of expenditure				
Capital expenditure				
Land, buildings and other structures	51 203	np	6.9	np
Other capital expenditure	39 784	np	5.3	np
<i>Total</i>	90 987	85 302	12.2	9.2
Current expenditure				
Labour costs	372 151	447 100	50.0	48.3
Other current expenditure	280 769	392 851	37.7	42.5
<i>Total</i>	652 920	839 951	87.8	90.8
Source of funds				
Own funds	179 142	247 853	24.1	26.8
Commonwealth government	284 612	323 881	38.3	35.0
State and local government	85 063	99 732	11.4	10.8
Other private non-profit organisations	47 036	98 423	6.3	10.6
Business	27 250	36 426	3.7	3.9
Joint business/government	910	np	0.1	np
Universities	3 914	6 039	0.5	0.7
Donations and bequests	38 421	39 295	5.2	4.2
Other Australian	317	np	—	np
Overseas	77 242	58 148	10.4	6.3
Location of expenditure				
New South Wales	259 287	339 950	34.9	36.7
Victoria	402 305	461 481	54.1	49.9
Queensland	22 218	36 937	3.0	4.0
South Australia	2 887	9 985	0.4	1.1
Western Australia	42 595	49 507	5.7	5.4
Tasmania	np	102	np	—
Northern Territory	np	np	np	np
Australian Capital Territory	1 129	np	0.2	np
Overseas	np	np	np	np
Type of activity				
Pure basic research	73 182	93 360	9.8	10.1
Strategic basic research	245 620	311 880	33.0	33.7
Applied research	261 407	320 357	35.1	34.6
Experimental development	163 698	199 657	22.0	21.6
Total expenditure on R&D	743 907	925 253	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) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year.
See Explanatory Note 2 for details.

2.2**PRIVATE NON-PROFIT EXPENDITURE ON R&D, by fields of research: values and proportions**

	EXPENDITURE ON R&D		PROPORTION OF TOTAL EXPENDITURE ON R&D	
	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	%	%
Mathematical Sciences	np	np	np	np
Physical Sciences	—	—	—	—
Chemical Sciences	np	10 821	np	1.2
Earth Sciences	np	—	np	—
Environmental Sciences	6 578	np	0.9	np
Biological Sciences	117 259	90 429	15.8	9.8
Agricultural and Veterinary Sciences	961	760	0.1	0.1
Information and Computing Sciences	np	2 039	np	0.2
Engineering	np	np	np	np
Technology	6 214	8 584	0.8	0.9
Medical and Health Sciences	559 338	748 929	75.2	80.9
Built Environment and Design	np	np	np	np
Education	np	np	np	np
Economics	np	np	np	np
Commerce, Management, Tourism and Services	np	—	np	—
Studies in Human Society	5 462	4 997	0.7	0.5
Psychology and Cognitive Sciences	6 700	3 329	0.9	0.4
Law and Legal Studies	np	np	np	np
Studies in Creative Arts and Writing	np	—	np	—
Language, Communication and Culture	np	np	np	np
History and Archaeology	—	—	—	—
Philosophy and Religious Studies	np	np	np	np
Total	743 907	925 253	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) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

2.3**PRIVATE NON-PROFIT EXPENDITURE ON R&D, by socio-economic objective:****values and proportions**

	EXPENDITURE ON R&D		PROPORTION OF TOTAL EXPENDITURE ON R&D	
	2008-09	2011-12(a)	2008-09	2011-12(a)
	\$'000	\$'000	%	%
Defence	—	—	—	—
Economic Development				
Plant Production and Plant Primary Products	np	np	np	np
Animal Production and Animal Primary Products	np	np	np	np
Mineral Resources (Excl. Energy Resources)	—	—	—	—
Energy	np	—	np	—
Manufacturing	9 417	25 176	1.3	2.7
Construction	—	—	—	—
Transport	—	—	—	—
Information and Communication Services	—	1 396	—	0.2
Commercial Services and Tourism	—	np	—	np
Economic Framework	318	—	—	—
<i>Total</i>	<i>10 741</i>	<i>27 611</i>	<i>1.4</i>	<i>3.0</i>
Society				
Health	685 258	828 449	92.1	89.5
Education and Training	np	62 566	np	6.8
Law, Politics and Community Services	5 979	3 544	0.8	0.4
Cultural Understanding	np	244	np	—
<i>Total</i>	<i>725 826</i>	<i>894 802</i>	<i>97.6</i>	<i>96.7</i>
Environment	6 713	2 840	0.9	0.3
Expanding Knowledge	627	—	0.1	—
Total	743 907	925 253	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) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year. See Explanatory Note 2 for details.

2.4 PRIVATE NON-PROFIT HUMAN RESOURCES DEVOTED TO R&D, by type of resource: values and proportions

	HUMAN RESOURCES DEVOTED TO R&D		PROPORTION OF TOTAL HUMAN RESOURCES DEVOTED TO R&D	
	2008-09	2011-12(a)	2008-09	2011-12(a)
	PYE	PYE	%	%
Researchers	3 051	3 178	63.7	61.3
Technicians	938	1 227	19.6	23.7
Other staff	799	778	16.7	15.0
Total human resources devoted to R&D	4 788	5 183	100.0	100.0

(a) Please note that the 2010–11 survey was deferred for a year and conducted for the 2011–12 financial year.
See Explanatory Note 2 for details.

EXPLANATORY NOTES

INTRODUCTION

1 This release presents statistics compiled from data collected from Australian government and private non-profit (PNP) organisations in the *Survey of Research and Experimental Development (R&D), Government and Private Non-Profit Organisations 2011–12*. The survey was conducted by the Australian Bureau of Statistics (ABS) via mail questionnaire and achieved a response rate of 98.1%.

REFERENCE PERIOD

2 For the Government and PNP sectors, the survey is conducted biennially and based on a single financial year. The 2010–11 survey was deferred for a year. The reference period for statistics presented in this issue is the financial year ended 30 June 2012. The *Survey of R&D, Government and Private Non-Profit Organisations* will be conducted again for 2012–13, before returning to a biennial (two-yearly) collection frequency.

DEFINITION OF R&D

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 *Australian and New Zealand Standard Research Classification (ANZSRC), 2008* (cat. no. 1297.0) or refer to the OECD publication *The Measurement of Scientific and Technological Activities: Proposed Standard Practice for Surveys on Research and Experimental Development - Frascati Manual 2002*.

5 Data providers report and self-classify R&D survey information based on their interpretation of OECD and ABS definitions and classifications. The ABS makes every effort to ensure correct and consistent interpretation and reporting of these data by applying consistent processing methodologies. See also the Reliability of Statistics and Revisions sections of the Technical Note.

FRAME

6 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

7 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).

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

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

Statistical units defined on
the ABSBR continued

10 Most 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 organisations have simple structures; therefore, the unit registered for an ABN will satisfy ABS statistical requirements. The organisations with simple structures constitute the ATOMP, and the ABN unit is used as the statistical unit for ABS economic collections.

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

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]*, 2002 (cat. no. 1372.0).

13 Statistical units for the *Survey of R&D, Government and Private Non-Profit Organisations* consist of ABN units for the ATOMP and TAUs from the ABSMP.

SCOPE AND COVERAGE

14 The *Survey of R&D, Government and Private Non-Profit Organisations* aims to be a complete enumeration of Australian government and PNP organisations with intramural expenditure on R&D during the reference period.

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

16 The ABS identifies organisations for inclusion in the survey if the organisation:

- reported expenditure on R&D in the previous survey; or
- was identified through other sources such as newspapers, journals, research compendia, etc. as likely to have expenditure on R&D.

17 From the 2004–05 cycle of the *ABS Survey of R&D, Government and Private Non-Profit Organisations*, 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).

18 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

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

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

NPIs Serving Households sector

21 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.

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

Survey exclusions

23 While the Government and PNP sectors for the *Survey of R&D, Government and Private Non-Profit Organisations* are based on SISCA, as per the Frascati Manual 2002 guidelines, the survey excludes:

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

24 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
(ANZSRC)

25 Type of activity, Fields of Research and Socio-economic Objective 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).

26 Some organisations may have experienced difficulty in classifying their R&D projects to Type of activity, Fields of Research and Socio-economic Objective. See also the Reliability of Statistics and Revisions sections of the Technical Note.

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 and have been revised from those used to calculate ratios in previous issues.

GROSS DOMESTIC PRODUCT, current prices

	2000-01	2002-03	2004-05	2006-07	2008-09	2011-12
	\$m	\$m	\$m	\$m	\$m	\$m
GDP	706 895	800 936	920 969	1 083 303	1 254 293	1 474 686

Source: *Australian National Accounts: National Income, Expenditure and Product, Dec 2012* (cat. no. 5206.0), released 6 March 2013

GROSS STATE PRODUCT, current prices

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
2008-09	391 662	282 945	258 746	79 998	176 143	22 095	16 625	26 078
2011-12	455 275	328 595	283 604	91 928	238 870	24 175	18 583	32 197

Source: *Australian National Accounts: State Accounts, 2011-12* (cat. no. 5220.0), released 21 November 2012

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 2011–12). They can be thought of as current price values re-expressed in (i.e. based on) the prices of the previous year and linked together to form continuous time series. They are formed in a multi-stage process of which the major steps are described in Section 15 of the *Information Paper: Australian National Accounts, Introduction of Chain Volume and Price Indexes* (cat. no. 5248.0).

R&D deflators

31 With the implementation of 2008 SNA, deflators used to calculate the chain volume measure of expenditure on R&D were 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. The revised deflators have been used for the *Survey of R&D* statistics from the 2008–09 survey cycle.

UPCOMING RELEASES

32 Upcoming ABS releases of R&D statistics include:
Research and Experimental Development, Businesses, Australia, 2011–12 (cat. no. 8104.0), to be released 6 September 2013

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, 2010–11 (cat. no. 8158.0)
Microdata: Business Longitudinal Database, Australia, 2004–05 to 2009–10 (cat. no. 8168.0.55.001)
Research and Experimental Development, Businesses, Australia, 2010–11 (cat. no. 8104.0)
Research and Experimental Development, Higher Education Organisations, Australia, 2010 (cat. no. 8111.0)
Selected Characteristics of Australian Businesses, 2010–11 (cat. no. 8167.0)
Summary of IT Use and Innovation in Australian Business, 2010–11 (cat. no. 8166.0)

34 Relevant OECD publications include:
Main Science and Technology Indicators 2012/2
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 Type of activity, Fields of Research and Socio-economic Objective 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.

Treatment of non-response

4 For non-responding organisations that had reported R&D activity in the 2008–09 survey, data for 2011–12 were imputed using previous cycle data.

5 For non-responding organisations that did not report R&D activity in the previous cycle, data were not imputed. These organisations are not expected to have significant levels of R&D activity.

REVISIONS

6 In processing 2011–12 data, no revisions were applied to 2008–09 estimates due to the three year gap between the collection cycles.

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.
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.
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.
Donations and bequests	As a source of R&D funding, this includes research specific donations and bequests from Australian organisations and individuals.
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.
Fields 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 organisation performed the R&D. This may not be the head office location of the 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 organisation) on behalf of the related entity.
Overseas location	Includes R&D performed overseas, but controlled by the Australian 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 organisation.
Own funds	Includes all funding for R&D sourced from the organisation itself, including: equity; borrowings; retained earnings; and non-R&D specific transfers from related entities.
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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