NATIONAL SURVEY OF RESEARCH COMMERCIALISATION 2008 AND 2009

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NATIONAL SURVEY OF RESEARCH COMMERCIALISATION 2008 AND 2009

Selected measures of commercialisation activity in Australia's Universities, Publicly Funded Research Agencies, Medical Research Institutes and Cooperative Research Centres

May 2011

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FOREWORD

Our publicly funded research organisations (PFROs) - universities, medical research institutes, publicly funded research agencies and Cooperative Research Centres - consistently make significant contributions to the Australian innovation system, not only through their development of human capital, but also by commercialising the outcomes of their work. The impact of some innovations from this sector, for example, CSIRO's Wireless Local Area Network technology, has been far-reaching. However, it is not simply paradigm changing technology that is coming from our PFROs. They also generate innovative business models and advances in marketing that not only generate wealth but also deliver 'win-win' results for the environment and society.



Research commercialised by our PFROs helps Australia maintain and improve living standards and respond to the broader social and environmental challenges of our time. Our businesses need to increase productivity and a key to this is being open to innovation. Increased productivity translates into sustainable jobs for ordinary Australians.

Increasing the pace and scale of knowledge exchange between the publicly funded research sector, industry and the wider community is vital if Australia is to remain an innovative nation and deliver productivity increases. Recognising this, the Australian Government has set an ambitious agenda to increase business innovation by 25 per cent and double the level of collaboration between Australian researchers and business over the next decade. This is actively supported through initiatives like Commercialisation Australia, Enterprise Connect and the Australian Centre for Renewable Energy.

The National Survey of Research Commercialisation (NSRC) plays a vital role in how we measure our institutions' success in sharing their innovation to fuel knowledge and drive productivity. It is an important policy making tool that is unique in its scope and breadth. The expression 'you cannot manage what you do not measure' certainly comes to mind in this context.

The NSRC collects data on the commercialisation activities of publicly funded research agencies. This survey report shows us the extent to which public researchers have successfully translated their ideas into valuable technologies, services, business models and other intellectual property.

Reading this report I have been encouraged by the commercial successes of the research sector in 2008 and 2009, notwithstanding the global financial crisis. The level of contract research and consultancy shows a significant degree of cooperation and knowledge exchange between industry and the research sector. This demonstrates the resilience of Australian research commercialisation and its growing contribution to innovation.

Senator the Honourable Kim Carr Minister for Innovation, Industry, Science and Research

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CONTENTS

Foreword	iii
Abbreviations	Х
Key Findings	1
Most recently surveyed years - 2008 and 2009	1
Time series 2000 - 09	1
International Comparisons	2
Cooperative Research Centres	3
1. Introduction	11
Survey purpose	11
The role of research commercialisation for Australia's future	11
Survey methodology	11
2. Results	13
Intellectual Property activity	13
Invention disclosures	13
Patent and Plant Breeder Rights: Applications, Issues and Holdings	13
Licences, options and assignments (LOAs)	18
Start-up company activity	23
Research contracts and consultancies and direct sales	26
Skills development and knowledge exchange activity	29
Resources for research commercialisation	29
3. Country Comparisons	33
Results	33

4.	Cooperative Research Centres (CRCs)	39
	Resourcing for commercialisation	39
	Intellectual Property protection activity	41
	Start-up company activity	44
	Research contracts and consultancy activity	46
	Professional development and other knowledge exchange activity	47
5.	Methodology	53
	NSRC data for 2008 and 2009	53
	NSRC time series 2000 to 2009	53
	International comparisons	62
	Research expenditure	63
	Cooperative Research Centres (CRCs)	63
Ap	pendix 1. Survey respondents 2008 and 2009	64
Ap	pendix 2. Survey questionnaire 2008 and 2009	66
Ap	pendix 3. Explanatory notes to the survey questionnaire 2008 and 2009	73
Ap	pendix 4. Start-up companies formed in 2008 and 2009	86
Re	eferences	87

vi

TABLES

Table 1:	Summary of selected NSRC survey metrics for 2008 and 2009	4
Table 2:	Summary of NSRC Metrics for surveys 2000-09	6
Table 3:	Summary of selected commercialisation metrics for Australia, US, Canada, UK and Europe 2000–09	7
Table 4:	Summary of selected Cooperative Research Centre (CRC) commercialisation metrics for 2005-06 to 2008-09	9
Table 5:	Invention disclosures in 2008 and 2009	14
Table 6:	New Intellectual Property protection applications filed in 2008 and 2009	14
Table 7:	Location of new patent and/or plant breeder rights applications filed in 2008 and 2009	16
Table 8:	Location of total patent and/or plant breeder rights applications filed in 2008 and 2009	16
Table 9:	Patent and plant breeder rights issued in 2008 and 2009	16
Table 10:	Total patent and/or plant breeder rights held and pending as at the last day of the reporting period	
	(cumulative number) for 2008 and 2009	17
Table 11:	Material Transfer Agreements	19
Table 12:	Number of, and income from, licences, options and assignments (LOAs) in 2008 and 2009	20
Table 13:	Capital raising for research commercialisation activities in 2008 and 2009	24
Table 14:	Start-up company formation and equity positions in 2008 and 2009	24
Table 15:	Research contracts, consultancies and direct sales number, and value in 2008 and 2009	27
Table 16:	Skills development and transfer in 2008 and 2009	30
Table 17:	Commercialisation staff numbers and staff costs in 2008 and 2009	31
Table 18:	Numbers of Cooperative Research Centres, 2005-06 to 2008-09	39
Table 19:	CRC research and commercialisation expenditure, 2005-06 to 2008-09	40
Table 20:	CRC patent filing activity, 2005-06 to 2008-09	40
Table 21:	CRC patent holdings, 2005-06 to 2008-09	43
Table 22:	CRC licences, options and assignments activity, 2005-06 to 2008-09	43
	CRC new start-up companies formed and income received, 2005-06 to 2008-09	45
Table 24:	CRC research contracts and consultancies, 2005-06 to 2008-09	46
Table 25:	Number of training courses and conferences offered to end-users and income derived from these activities,	
	2005-06 to 2008-09	49
Table 26:	Publication and reports prepared for end-users and postgraduate employment in industry, 2005-06 to 2008-09	49
Table 27:	List of metrics covered in the NSRC consistent time series dataset for 2000-09	54
Table 28:	Details of the data coverage for 16 key commercialisation metrics, 2000-09	55
Table 29:	Total metric values in the consistent time series dataset 2000–09	61
Table 30:	Differences between totals in the full sample and the consistent time series dataset in 2009	62
Table 31:	Start-up companies formed in 2008	86
Table 32:	Start-up companies formed in 2009	86

vii

FIGURES

Figure 1:	Number of invention disclosures by sector 2000-09	13
Figure 2:	Number of new Australian and United States patent and/or plant breeder rights applications filed by sector 2000-09	17
Figure 3:	Patent and/or plant breeder rights issued worldwide by sector 2003-09	17
Figure 4:	Sum of institutional averages of patent family filings, issuances and holdings by sector in 2009	18
Figure 5:	Distribution of LOA agreements value by income range in 2009	19
Figure 6:	Number of LOAs executed by sector 2000-09	22
Figure 7:	Number of LOAs yielding income by sector 2000-09	22
Figure 8:	Adjusted gross LOA income by sector 2000-09	22
Figure 9:	Number of new start-up companies formed per year by sector 2000-09	23
Figure 10:	Number of start-up companies operational at year's end with institutional equity stake by sector 2000-09	25
Figure 11:	Value of research commercialisation equity holdings by sector 2000-09	25
Figure 12:	Number of research contracts by range of contract value in 2009	28
Figure 13:	Number of research consultancies by range of contract value in 2009	28
Figure 14:	Value of research contracts, consultancies and/or direct sales executed by sector in 2009	29
Figure 15:	Number of dedicated commercialisation staff by sector 2000-09	32
Figure 16:	International comparison of average numbers of commercialisation and licensing staff (FTEs) per institution, 2003-09	35
Figure 17:	International comparison of the number of invention disclosures per \$US100m research expenditure, 2003-09	35
Figure 18:	International comparison of the number of US patents issued per \$US100m research expenditure, 2003-09	36
Figure 19:	International comparison of the number of LOAs executed per \$US100m research expenditure, 2003-09	36
Figure 20:	International comparison of LOA income as a percentage of research expenditure, 2003-09	37
Figure 21:	International comparison of start-up companies formed per \$US100m research expenditure, 2003-09	37
Figure 22:	Commercialisation expenditure per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	41
Figure 23:	Total number of patents filed per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	42
Figure 24:	Total number of patents maintained per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	42
Figure 25:	Income from licences, options and assignments (LOAs) per \$100m research expenditure for each CRC sector,	
	2005-06 to 2008-09	44
Figure 26:	Number of new start-up companies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	45
Figure 27:	Income from new start-up companies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	45
Figure 28:	Number of research contracts and consultancies per \$100m research expenditure for each CRC sector,	
	2005-06 to 2008-09	46
Figure 29:	Income from research contracts and consultancies per \$100m research expenditure for each CRC sector,	
	2005-06 to 2008-09	47
Figure 30:	Number of training courses offered to end-users per \$100m research expenditure for each CRC sector,	
	2005-06 to 2008-09	48

viii

Figure 31:	Number of conferences offered to end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	48
Figure 32:	Income from courses and conferences provided to end-users per \$100m research expenditure for each CRC sector,	
	2005-06 to 2008-09	50
Figure 33:	Number of publications for end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09	50
Figure 34:	Number of confidential and unpublished reports for end-users per \$100m research expenditure for each	
	CRC sector, 2005-06 to 2008-09	51
Figure 35:	Number of CRC postgraduates to take up employment in industry per \$100m research expenditure for each	
	CRC sector, 2005-06 to 2008-09	51

ix

ABBREVIATIONS

ABS	Australian Bureau of Statistics
AIMS	Australian Institute of Marine Science
ANSTO	Australian Nuclear Science and Technology Organisation
AUTM	Association of University Technology Managers (USA)
CCST	Coordination Committee on Science and Technology
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DIISR	Department of Innovation, Industry, Science and Research
DSTO	Defence Science and Technology Organisation
FTE	Full-time equivalents (staff)
GFC	Global Financial Crisis
HE-BCIS	Higher Education Business and Community Interaction Survey
HEFCE	Higher Education Funding Council of England
IP	Intellectual property
IPO	Initial public offering
LOAs	Licences, options and assignments
m	Million
MDQ	Management Data Questionnaire
MTA	Material Transfer Agreement
MRI	Medical Research Institute
NICTA	National Information and Communications Technology Australia
NSRC	National Survey of Research Commercialisation
PCT	Patent Cooperation Treaty
PFRA	Publicly funded research agency (ANSTO, AIMS, CSIRO, DSTO, NICTA)
R&D	Research and development
UK	United Kingdom
UNICO	The University Companies Association (UK)
US	United States of America

Х

KEY FINDINGS

Seventy-two institutions responded to the National Survey of Research Commercialisation 2008 and 2009. The data collected shows the impact of the Global Financial Crisis (GFC) on many of the commercialisation outputs metrics, while patenting activity and other commercialisation input metrics increased.

MOST RECENTLY SURVEYED YEARS - 2008 AND 2009

This report, which covers the period of the GFC, shows the public research sector with somewhat poorer financial returns compared to previous years, but sustained interest in commercialisation and a growing reservoir of intellectual property to support commercialisation activity into the future. A greater awareness of the potential benefits of commercialisation of intellectual property (IP) is suggested by the rising levels of invention disclosures and patent filing.

For the 2008 and 2009 survey period, institutions reported the following (see Table 1 and Chapter 2 for further details):

- The number of invention disclosures continued to increase by 12% p.a.
- Patent filings and issuances show solid growth over 2008 and 2009 compared to 2007 figures.
- The number of Licences, Options and Assignments (LOAs) executed by the sector fell by 8% over the 2007 figures.
- Income from LOAs totalled \$315m.
- Income from research contracts and consultancies totalled over \$1.2 billion in each of the two surveyed years, maintaining the 2007 level of income.
- Start-up company formation has continued its steady decline which began at the start of the decade.
- The value of equity holdings of the sector was over \$234m, a 20% increase in value over 2007 equity holdings.
- Total commercialisation costs were \$88m, a 15% increase in costs over 2007 figures.

There are two key messages that emerge from the above highlights.

Firstly, that the indicators which are dependent on capital and/or good economic conditions to stimulate sales, such as LOA income and capital raising were severely impacted by the GFC. The 'deal flow' also decreased (number of LOAs executed), as businesses and industry re-evaluated their investment strategies.

However, those indicators which look to the future such as invention disclosures, patenting activity, research contracts and consultancies and resources allocated towards commercialisation activities, all show growth. They portray an optimistic future outlook by the sector, particularly given the economic environment of the survey period which was dominated by the GFC.

Secondly, while the LOA income of \$315m for 2009 was a significant increase (35%) over the 2007 figure of \$233m, it is solely based on income received by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) for its WLAN technology. The impact of one or a handful of successfully commercialised technologies on the sector's LOA earnings can be highly significant against earlier long term average levels of earnings, and can "mask" other trends. For example, in 2008, prior to any CSIRO income from its WLAN technology, LOA earnings for the sector had declined by 53% to \$111m, showing the severe impact of the GFC (see Table 1).

TIME SERIES 2000 - 09

Based on a subset of 58 institutions for which time series data is available between 2000 and 2009 (see Table 2 and Chapter 2), the report found the following:

- The number of dedicated commercialisation staff has risen by 62% from 191 in 2000 to 309 in 2009 with no change from 2008.
- The total number of invention disclosures has increased by 159% from 544 in 2000 to 1,409 in 2009.
- Adjusted¹ LOA income across all institutions has increased by 118% from \$137m in 2000 to \$299m in 2009². This increase was dominated in the 2009 figures by the contribution of CSIRO's successful WLAN patent prosecution.

¹ Adjusted for payments made to other institutions.

² Dollar figures adjusted to 2009 dollars for all time-series data using the chain-volume index applied to the Gross Domestic Product in the Australian System of National Accounts. Reference -5206.0 Australian National Accounts: National Income, Expenditure and Product. Table 32. Expenditure on Gross Domestic Product (GDP), Chain volume measures and Current prices, Annual. Gross domestic product:Implicit price deflators. http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/6A0EE46E436DBB8FCA2574 B800162692/\$File/5206032_expenditure_on_gdp_annual.xls#A2304755F

- The total value of institutional equity held in start-up companies has increased by 32% from \$168m in 2000 to \$222m in 2009 in adjusted terms. The growth in the value of the equity holdings suggests that the decision-making process has improved the profitability of portfolio holdings of the sector overall.
- The total number of start-up companies formed each year by the research sector has fallen to 19 in 2009, from 47 in 2000. The total number of start-up companies operational at the end of the year (in which institutions held equity) decreased by 13% between 2007 and 2009, from 200 to 175 respectively.
- The total number of new patent and plant breeders rights applications filed by institutions in both Australia and the US has increased by 9% from 587 in 2000 to 641 in 2009.
- The number of patents and plant breeder rights issued to Australian research organisations worldwide has increased by 60% to 841 in 2009, from 524 in 2000.

As with previous surveys, the 2008 and 2009 National Survey of Research Commercialisation (NSRC) found a large proportion of IP protection and LOA activity being carried out by a relatively small number of institutions, including the CSIRO and a select number of universities.

INTERNATIONAL COMPARISONS

Data from the European Union has been introduced for the first time.

Comparisons of the Australian research sector with the United States (US), Canada, the United Kingdom (UK) and Europe, after adjusting for research expenditure (per \$US100m) and US dollar purchasing power parity³ (see Table 3 and Chapter 3), show that:

- For 2008, invention disclosures in Australia averaged 25 per \$100m research expenditure per annum, similar to institutions in Europe (29) but are significantly lower than the US (41), Canada (44) and the UK (50).
- The number of US patents issued in Australia per \$US100m research expenditure has more than halved between 2000 and 2009 from 4.2 to 1.5. This decline is potentially due to an increase in overall research expenditure levels at a greater rate than patent issuances. The US has also experienced a decline over this period, falling from 14.0 in 2000 to 6.6 in 2009, Canadian issuances have also steadily dropped from 8.8 in 2000 to 2.6 in 2008.
- The number of LOAs executed per \$US100m research expenditure by Australian institutions has declined 40% from 15 in 2000 to 9 in 2009. Similarly, the number of LOAs executed by US institutions has fallen by 38% over the same period, from 16 to 10. Canadian institutions have had mixed levels of performance, with LOAs executed per \$US100m research expenditure varying from 19 in 2000 to as low as 12 in 2006, only to rise again in 2007 to 18.
- Australia's LOA income as a percentage of research expenditure compares favourably with other countries (see Figure 20). The average ratio of LOA income to total research expenditure is 2.2, compared with 1.8 for Europe, 1.5 for Canada, 4.7 for the US and 1.3 for the UK.

³ Purchasing Power Parities are taken from the OECD Main Science and Technology Indicators. Refer to http://stats.oecd.org/Index. aspx?datasetcodes=SNA_TABLE4 and for information about purchasing power parities refer to http://www.oecd.org/about/0,2337, en_2649_34357_1_1_1_1_1_0.html

COOPERATIVE RESEARCH CENTRES

Cooperative Research Centres play an important role in commercialisation, utilisation and knowledge exchange. Following a review of the program in 2008⁴, the emphasis of the program was modified to support end-user driven research partnerships to address clearly articulated, major challenges that require medium to long-term collaborative efforts.

Data from the CRC program Management Data Questionnaire (see Chapter 4 for full details) shows:

- The Services sector accounts for the largest proportion of the total number of CRCs in 2009 (22 out of a total of 46, 48%), followed by the Agriculture, Forestry and Fishing industry (16 out of 46, 35%) (see Table 18).
- Between 2005-06 and 2008-09, commercialisation expenditure relative to research expenditure has increased by 42% (see Table 19).
- The number of patent applications filed per \$100m research expenditure⁵ (see Figure 23) by all CRCs, grew from 16 in 2005-06 to 21 in 2007-08, but has dropped back to previous levels in 2008-09.
- Total CRC patent holdings (patents maintained) per \$100m research expenditure (see Figure 24) has varied between 92 and 125 over the 2005-06 and 2008-09 period. This rapid variation in reported holdings is possibly due to the highly cyclical nature of the program with the exiting and entry of major (large) CRCs to the program (see Table 18 and Table 21).
- Between 2005-06 and 2008-09, licensing of IP arising out of research has become a more common avenue for commercialisation (300% increase) than the formation of start-up companies (decrease of 73%) (see Table 22 and Table 23).
- The income generated per \$100m research expenditure from LOAs has increased from \$2.7m to \$5.3m between 2005-06 and 2008-09 (see Figure 25).
- The number of start-up companies formed per \$100m research expenditure by all CRCs declined from 1.4 to 0.3 (79%) between 2005-06 and 2007-08 and has remained low at 0.6 in 2008-09 (see Figure 26).

- The income generated from new start-up companies such as royalties and realised equity, also fell over the same period with no income generated in 2007-08 and \$2,000 per \$100m research expenditure income reported for 2008-09 (see Figure 27).
- The number of contracts and consultancies generating income per \$100m research expenditure increased by 51% between 2005-06 (67) and 2008-09 (101) (see Figure 28). Income generated by contracts and consultancies has grown over time from \$8.0m to \$8.8m per \$100m research expenditure over this period (see Figure 29).
- Between 2005-06 and 2008-09, CRCs showed growth in knowledge exchange activities per \$100m research expenditure (see Table 4) with increases in the numbers of:
 - training courses up 14% from 43 to 49 (see Figure 30);
 - conferences up 100% from 68 to 136 (see Figure 31);
 - publications up 18% from 311 to 368 (see Figure 33); and
 - reports provided to end-users up 89% from 105 to 198 (see Figure 34).
- Between 2005-06 and 2008-09, income generated from courses and conferences provided to end-users per \$100m research expenditure decreased from \$259,000 to \$176,000 (see Figure 32).
- Postgraduate placements in industry per \$100m research expenditure have declined 12% from 42 in 2005-06 to 37 in 2008-09 (see Figure 35).

⁴ http://www.innovation.gov.au/innovationreview/Documents/CRCReviewReport.pdf

⁵ CRC activity was expressed as a function of research expenditure to account for the changing number of CRCs between years. For more information see the CRC section in the Methodology chapter.

Table 1: Summary of selected NSRC survey metrics for 2008 and 20096

		CSIRO	CSIRO Other P		RAs	Universities			5	Total Act	Total Activity	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	
Resourcing for commercialisation												
Total FTE	FTE	156	153	44	45	442	460	44	48	685	706	
Total staff costs	\$'000	24,343	21,810	7,879	8,065	49,853	50,508	7,189	7,620	89,265	88,003	
Intellectual Property activity												
Invention disclosures received	No.	67	96	42	41	1,146	1,199	127	162	1,382	1,498	
Patent and plant breeder rights filed Total	No.	322	262	38	119	1,274	1,253	271	304	1,905	1,938	
Patent and plant breeder rights issued												
- In Australia	No.	26	22	4	3	117	103	22	24	169	152	
- In the US	No.	15	17	3	3	43	53	10	14	71	87	
- Elsewhere	No.	145	135	20	9	435	444	27	39	627	627	
- Total	No.	186	174	27	15	595	600	59	77	867	866	
Patent and plant breeder rights holdings												
- Patents Pending	No.	1,861	2,151	296	412	3,347	3,065	668	667	6,172	6,295	
- Patents issued (cumulative)	No.	2,073	1,568	160	177	1,986	1,860	496	522	4,715	4,127	
- Total held	No.	3,934	3,719	456	589	5,333	4,925	1,164	1,189	10,887	10,422	
Patent and plant breeder rights culled or lapsed	No.	408	752	74	17	687	818	134	189	1,303	1,776	
Licensing activity				· · · ·								
Material Transfer Agreements	No.	25	87	2	2	266	342	444	497	737	928	
Income from MTAs	\$'000	30	166	0	0	30	116	37	20	96	302	
LOAs executed	No.	109	102	24	21	241	266	111	119	485	508	
LOAs active	No.	424	470	118	122	811	936	258	310	1,611	1,838	
LOAs yielding income	No.	201	248	16	14	305	318	117	122	639	702	
Adjusted gross LOA income	\$'000	12,976	238,979	1,489	526	72,825	54,257	23,449	21,082	110,739	314,844	

6 Note that all dollar values in this table are presented in constant 2009 prices (Tabled data in Chapter 2 is not).

		CSIRO	CSIRO		Other PFRAs Universi		ities MRIs		ls	Total Activity	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Start-up company activity											
Start-up companies created	No.	0	0	1	2	12	24	3	1	16	27
Capital raising - total	\$'000	7,949	58,523	0	0	45,237	73,604	16,941	6,036	70,127	138,163
Operational start-up companies which are dependent on licensing/ assignment of technologies	No.	20	18	8	6	160	168	24	24	212	216
Start-up companies in which institutions have an equity holding	No.	20	18	7	6	146	152	19	20	192	196
Value of all equity holdings	\$'000	69,750	81,780	744	713	101,739	111,797	15,427	39,923	187,660	234,213
Research contracts and consultancy a	ctivity							i de la companya de l			
Contracts & consultancy agreements entered into	No.	2,148	2,258	406	1,460	10,224	10,171	514	508	13,292	14,397
Total gross agreed value	\$'000	242,451	337,213	37,414	27,220	889,416	791,107	74,917	68,844	1,244,197	1,224,383
Skills development and transfer activ	ity										
Research postgraduates employed in start-up companies	No.	45	37	4	3	54	59	15	12	118	111

Table 2: Summary of NSRC Metrics for surveys 2000-09^{7,8}

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Resourcing for commercialisation											
Dedicated commercialisation staff	FTE	191	231	281	296	282	295	299	289	309	309
Intellectual Property activity											
Invention disclosures	No.	544	716	707	810	956	926	1,081	1,196	1,300	1,409
New Australian and US patent and plant breeder rights applications filed	No.	587	470	503	539	587	518	546	527	650	641
Patent and plant breeder rights issued worldwide	No.	524	273	315	805	814	540	582	508	844	841
Licensing activity											
LOAs executed	No.	414	383	445	433	381	453	515	549	472	491
LOAs yielding income	No.	489	605	629	629	666	656	708	746	629	691
Adjusted gross income from LOAs in constant 2009 prices	\$'000	136,867	93,148	91,931	83,793	73,996	73,952	126,432	233,270	93,794	299,104
Start-up company activity											
Start-up companies formed during the year	No.	47	61	58	50	29	38	41	33	14	19
Start-up companies operational at year end dependent on assignment of technology	No.	86	109	119	228	251	220	237	242	196	195
Start-up companies operational at year end with institutional equity stakes	No.	69	79	96	182	203	169	192	200	176	175
Value of equity holdings in constant 2009 prices	\$'000	168,363	169,952	145,196	196,125	230,353	183,282	202,351	202,992	177,162	221,856

⁷ For each of these metrics, the unit record files from previous surveys as well as the data provided by Knowledge Commercialisation Australasia were scrutinised and any inconsistencies or errors corrected. Consequently some values presented here will not be the same as previously reported.

⁸ The data represented here is drawn from the current time series cohort, representing 58 organisations (ie, this data is a subset of the total cohort data).

Table 3: Summary of selected commercialisation metrics for Australia, US, Canada, UK and Europe 2000–09^{9,10}

Commercialisation FEE per Institution Australia 3.9 3.3 3.8 4.2 4.1 4.1 4.0 4.4 4.2 Canada 3.2 3.3 3.4 3.8 4.4 4.5 4.7 5.3 6.2 5.7 Europe (accl. UK) - - - 7.3 6.7 8.2 9.7 5.7 United Kingdom - 4.7 6.0 9.6 1.1 -		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Abstratia 3.9 3.3 3.8 4.2 4.1 4.1 4.0 4.4 4.4 Canada 3.2 3.3 3.4 3.8 4.4 4.5 4.7 5.3 6.2 7.7 Europe (axcl. UK) - - - - 7.3 6.7 8.2 9.7 7.7 United Kingdom - 4.7 6.0 9.5 9.6 11.1 - <td>Resourcing for Commercialisation</td> <td></td>	Resourcing for Commercialisation										
Canada 3.2 3.3 3.4 3.8 4.4 4.5 4.7 5.3 6.2 Europe (excl. UK) - - - - 7.3 6.7 8.2 9.7 United Kingdom - 4.7 6.0 9.5 9.6 11.1 - - - United States 3.3 3.6 3.9 4.0 4.3 4.4 4.8 5.0 5.4 5.1 Intel States 3.3 3.6 3.9 4.0 4.3 4.4 4.8 5.0 5.4 5.1 Intel States 3.3 3.6 3.9 4.0 4.1 4.8 5.0 5.4 5.1 Intel States 3.0 7.5 2.4 2.9 2.8 2.8 2.0 2.1 2.1 2.1 2.3 3.3 4.9 5.3 4.9 4.3 4.3 4.4 4.1 4.3 4.3 4.3 4.3 4.3 4.3 4.3 4.3	Commercialisation FTE per Institution										
Europe lexcl. UK) - - 7.3 6.7 8.2 9.7 United Kingdom - 4.7 6.0 9.5 9.6 11.1 - - - United States 3.3 3.6 3.9 4.0 4.3 4.4 4.8 5.0 5.4 5.5 Australia 20 25 24 23 27 24 29 28 25 2 Canada 57 41 45 44 40 41 39 44 41 Europe lexcl. UK) - - - 29 29 28	Australia	3.9	3.3	3.8	4.2	4.1	4.1	4.1	4.0	4.4	4.3
United Kingdom - 4.7 6.0 9.5 9.6 11.1 - - - United States 3.3 3.6 3.9 4.0 4.3 4.4 4.8 5.0 5.4 5.5 Intellectual Property Activity	Canada	3.2	3.3	3.4	3.8	4.4	4.5	4.7	5.3	6.2	-
United States 3.3 3.6 3.9 4.0 4.3 4.4 4.8 5.0 5.4 5.5 Intellectual Property Activity Invention Disclosures per USD100m Research Expenditure Inventin Disclosures Per USD100m Research Expenditure	Europe (excl. UK)	-	-	-	-	-	7.3	6.7	8.2	9.7	-
Intellectual Property Activity Australia 20 25 24 23 27 24 27 28 25 2 Canada 57 41 45 44 40 41 39 44 41 Europe (excl. UK) - - - 29 29 29 28 28 United Kingdom 47 49 50 53 49 53 53 49 43 United States 46 42 41 40 41 42 41 39 38 Juited States Patents Issued per USD100m Research Expenditure - - - - 2.4 2.7 1.8 1.4 1.1 Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 3.6 Europe (excl. UK) - - - - - 1.2 1.5 4.3 Onited States 14.0 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.4	United Kingdom	-	4.7	6.0	9.5	9.6	11.1	-	-	-	-
Australia 20 25 24 23 27 24 27 28 25 2 Canada 57 41 45 44 40 41 39 44 41 Europe (excl. UK) - - - 29 29 29 28 28 United Kingdom 47 49 50 53 49 53 53 49 43 United States 46 42 41 40 41 42 41 39 38 Inited States 46 42 41 40 41 42 41 39 38 Inited States 46 42 41 40 41 42 41 39 38 Inited States 8.8 7.1 6.6 2.4.5 3.8 3.1 3.4 2.6 4.5 Europe [excl. UK] - - - 7.7 7.2 1.5 6.6 4.5 <td>United States</td> <td>3.3</td> <td>3.6</td> <td>3.9</td> <td>4.0</td> <td>4.3</td> <td>4.4</td> <td>4.8</td> <td>5.0</td> <td>5.4</td> <td>5.9</td>	United States	3.3	3.6	3.9	4.0	4.3	4.4	4.8	5.0	5.4	5.9
Australia 20 25 24 23 27 24 27 28 25 2 Canada 57 41 45 44 40 41 39 44 41 Europe (excl. UK) - - - 29 29 29 28 28 28 United Kingdom 47 49 50 53 49 53 53 49 43 43 United Kingdom 47 49 50 53 49 43 44 44 44 44 44 44 44 44 4	Intellectual Property Activity										
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United Kingdom 47 49 50 53 49 53 53 49 43 United States 46 42 41 40 41 41 42 41 39 33 Jnited States Add 42 42 41 40 41 41 42 41 39 33 Jnited States Patents Issued per USD100m Research Expenditure 42 2.3 1.9 3.7 5.7 2.4 2.7 1.8 1.4 1.1 Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 4.5 Europe [excl. UK] - - - - 1.2 1.5 4.3 4.6 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.4 Liteope [excl. UK] 13 11.8 10.0 10.2 1.1 12 13 13	Canada	57	41	45	44	40	41	39	44	41	-
United States 46 42 41 40 41 41 42 41 39 33 Jnited States Patents Issued per USD100m Research Expenditure 4.2 2.3 1.9 3.7 5.7 2.4 2.7 1.8 1.4 1.4 Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 3.5 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 2.6 3.6 3.1 3.4 3.6 3.6 3.1 3.4 3.6 3.6 3.1 3.6 3.6 3.6 3.1 3.6 3.6 3.6 3.7 3.7 7.2 7.4 6.6 3.6	Europe (excl. UK)	-	-	-	-	29	29	29	28	28	-
Juited States Patents Issued per USD100m Research Expenditure Australia 4.2 2.3 1.9 3.7 5.7 2.4 2.7 1.8 1.4 1.4 Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 Europe (excl. UK) - - - - - 1.2 1.5 4.3 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.6 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.6 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.6 Licensing Activity 0.4 11.8 10.0 10.2 11.9 13 13 9 9 Canada 19 13 14 15 16 16 12 18	United Kingdom	47	49	50	53	49	53	53	49	43	-
Australia 4.2 2.3 1.9 3.7 5.7 2.4 2.7 1.8 1.4 1.4 Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 Europe [excl. UK] - - - - - 1.2 1.5 4.3 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.6 Licensing Activity - - - - - 1.2 1.3 4.3 6.6 6.2 8.9 7.7 7.2 7.4 6.4 6.6 Licensing Activity 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.6 Loss Executed per USD100m Research Expenditure - - - 11 12 13 13 9 9 9 Canada 19 15 14 15 16 16 12 18 14 14 Europe [excl. UK] - -	United States	46	42	41	40	41	41	42	41	39	38
Canada 8.8 7.1 6.6 6.2 4.5 3.8 3.1 3.4 2.6 Europe [excl. UK] - - - - - 1.2 1.5 4.3 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.4 Licensing Activity <t< td=""><td>United States Patents Issued per USD100m</td><td>Research Expend</td><td>iture</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	United States Patents Issued per USD100m	Research Expend	iture								
Europe (excl. UK) - - - - 1.2 1.5 4.3 United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.4 6.4 Licensing Activity	Australia	4.2	2.3	1.9	3.7	5.7	2.4	2.7	1.8	1.4	1.5
United States 14.0 11.8 10.0 10.2 8.9 7.7 7.2 7.4 6.4 6.4 Licensing Activity	Canada	8.8	7.1	6.6	6.2	4.5	3.8	3.1	3.4	2.6	-
Licensing Activity LOAs Executed per USD100m Research Expenditure Australia 15 13 14 12 13 13 9 Canada 19 15 14 15 16 16 12 18 14 Europe [excl. UK] - - - 14 16 13 9 9 United Kingdom 16 12 14 38 34 42 47 - -	Europe (excl. UK)	-	-	-	-	-	-	1.2	1.5	4.3	-
LOAs Executed per USD100m Research Expenditure Australia 15 13 14 12 11 12 13 13 9 Canada 19 15 14 15 16 16 12 18 14 Europe (excl. UK) - - - 14 16 13 9 9 United Kingdom 16 12 14 38 34 42 47 - -	United States	14.0	11.8	10.0	10.2	8.9	7.7	7.2	7.4	6.4	6.6
Australia 15 13 14 12 11 12 13 13 9 Canada 19 15 14 15 16 16 12 18 14 Europe (excl. UK) - - - 14 38 34 42 47 - -	Licensing Activity										
Canada 19 15 14 15 16 16 12 18 14 Europe (excl. UK) - - - 14 16 13 9 9 United Kingdom 16 12 14 38 34 42 47 - -	LOAs Executed per USD100m Research Expo	enditure									
Europe (excl. UK) - - - 14 16 13 9 9 United Kingdom 16 12 14 38 34 42 47 - -	Australia	15	13	14	12	11	12	13	13	9	9
United Kingdom 16 12 14 38 34 42 47	Canada	19	15	14	15	16	16	12	18	14	-
	Europe (excl. UK)	-	-	-	-	14	16	13	9	9	
United States 16 12 12 12 12 11 10 10 10	United Kingdom	16	12	14	38	34	42	47	-	-	-
	United States	16	12	12	12	12	12	11	10	10	10

9 Source: AUTM survey (US and Canada comparisons), the UNICO survey (UK comparisons of FTEs) and the HEFCE survey (All other UK comparisons). The research expenditures used to calculate the Australian metrics in this table are an aggregate of the total research expenditures reported by Australian institutions for a given year. For further information see the International Comparisons section in the Methodology chapter.

10 Differences between the NSRC 2003 & 2004, the 2005-07 publication and the current Report are due to the use of US\$ Purchasing Power Parity terms for 2004, 2007 and 2009 respectively.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Ratio of LOA Income to Total Research E	Expenditure									
Australia	2.8	2.0	1.9	1.6	1.3	1.3	2.1	3.6	1.5	4.1
Canada	1.8	2.3	1.6	1.6	1.4	1.2	1.4	1.2	1.0	-
Europe (excl. UK)	-	-	-	-	3.2	3.2	0.4	1.0	1.3	-
United Kingdom	0.6	1.1	1.1	1.1	1.5	1.3	1.3	1.4	2.1	-
United States	4.8	3.4	3.5	3.4	3.4	5.3	4.8	5.5	6.6	6.5
Start-up Company Activity										
Start-up Companies Formed per USD10)0m Research Expendi	ture								
Australia	1.7	2.2	1.9	1.4	0.9	1.0	1.1	0.9	0.3	0.5
Canada	3.8	3.0	1.9	2.0	1.4	1.0	0.8	1.1	0.9	-
Europe (excl. UK)	-	-	-	-	1.5	1.8	3.1	2.3	1.9	-
United Kingdom	5.3	4.2	3.6	2.9	2.4	2.9	3.2	3.0	2.1	-
United States	1.5	1.4	1.1	1.0	1.1	1.2	1.2	1.1	1.2	1.1

Table 4: Summary of selected Cooperative Research Centre (CRC) commercialisation metrics for 2005-06 to 2008-09¹¹

		2005-06	2006-07	2007-08	2008-09
CRCs responding	No.	66	53	56	46
Research expenditure	\$'000	804,729	745,159	669,640	536,941
Resourcing for commercialisation per \$100m research expenditure					
Commercialisation expenditure per \$100m research expenditure	\$'000	12,238	12,233	14,018	17,334
Intellectual property protection activity per \$100m research expenditure					
Patents filed In Australia	No.	9	11	13	10
Patents filed overseas	No.	7	7	8	7
Patents filed total	No.	16	18	21	16
Patents maintained in Australia	No.	31	29	30	34
Patents maintained overseas	No.	78	63	69	92
Patents maintained total	No.	109	92	99	125
Licensing activity per \$100m research expenditure					
LOAs contracted	No.	9	18	15	41
Income from LOAs	\$'000	2,705	2,490	3,306	5,281
Start-up company activity per \$100m research expenditure					
Start-up companies formed	No.	1.4	0.8	0.3	0.6
Income from new start-up companies – total	\$'000	118	105	0	2
Research contracts and consultancy activity per \$100m research expenditure					
Contracts and consultancy agreements generating income	No.	67	81	90	101
Contracts and consultancy income	\$'000	7,951	8,152	7,832	8,824
Training, development and knowledge exchange activity per \$100m research ex	penditure				
Professional training courses offered to end-users	No.	43	29	43	49
Conferences provided for end-users	No.	68	59	84	136
Income from courses and conferences	\$'000	259	187	208	176
CRC postgraduates taking up employment in industry	No.	42	43	47	37
Publications for end-users	No.	311	201	346	368
Confidential and unpublished reports for end-users	No.	105	119	148	198

¹¹ Note that all dollar values have been adjusted to 2009 prices.

1. INTRODUCTION

The National Survey of Research Commercialisation (NSRC) provides information on commercialisation in Australian publicly funded research agencies (PFRAs), universities and medical research institutes (MRIs) (collectively known as Publicly Funded Research Organisations (PFROs)). The survey was first conducted for the year 2000¹² and followed with surveys conducted for the years 2001 and 2002¹³, the years 2003 and 2004¹⁴ and 2005 through to 2007 (published 2009). This survey covers the years 2008 and 2009 inclusively and provides the results of the most recent survey, some international benchmarking, as well as information on the commercialisation activities of Cooperative Research Centres (CRCs).

SURVEY PURPOSE

The NSRC reveals the trends in commercialisation activity undertaken by Australian PFROs and is compiled as a reference document for subsequent analysis and policy development. Quantitative information on commercialisation performance is provided in relation to a number of specific indicators. The NSRC does not reflect the commercialisation activity of every PFRO in Australia, nor does it capture all of the social or environmental outcomes of this activity.

The report does not aim to promote research commercialisation as a core role for these institutions¹⁵. The importance of the research sector is in educating the next generation of innovators, adding to the stock of useful knowledge, problem solving and providing a public space for dialogue and debate.¹⁶ There is however a need for greater knowledge transfer and links between industry and the research sector, and commercialisation is one avenue.

- 13 Department of Education, Science and Training (2004) *National Survey of Research Commercialisation: Years 2001 and 2002.* Canberra, Department of Education, Science and Training. Available at:
- http://www.innovation.gov.au/INNOVATION/REPORTSANDSTUDIES/Pages/NationalSurveyofResearchCommercialisation.aspxing the standard standard
- 14 Department of Education, Science and Training. 2007. National Survey of Research Commercialisation 2003-2004 and commercialisation case studies. Canberra, Department of Education, Science and Training. Available at http://www.innovation.gov.au/INNOVATION/REPORTSANDSTUDIES/Pages/NationalSurveyofResearchCommercialisation.aspx
- 15 It is important to note that licensing revenues from research commercialisation are less than 2% of Australian university revenue streams.
- 16 Cutler T (2008) Venturous Australia: Building strength in innovation. Cutler and Company, Melbourne, p67.

THE ROLE OF RESEARCH COMMERCIALISATION FOR AUSTRALIA'S FUTURE

Commercialisation is a process which links the research and industry sectors and requires them to develop mechanisms for knowledge exchange and collaboration. These links are crucial to facilitate the flow of productive ideas and information from our PFROs. Commercialisation of research contributes to innovation in Australian organisations, lifting productivity and/or profitability and underpinning competitive advantage. In aggregate, the commercialisation of publicly funded research contributes to Australia being an innovative and globally competitive economy.

Innovative PFROs, in partnership with industry, have demonstrated Australia's capability to meet significant economic, social, health and environmental challenges effectively. Gardasil[™] and Relenza[™] are two examples where publicly funded research has developed into world-changing innovations through the creation of new business ventures and high value-added jobs. Gardasil[™] is the world's first vaccine for the human papilloma virus, the number one cause of cervical cancer, and Relenza[™] is a drug that can significantly reduce the duration and severity of influenza symptoms.

SURVEY METHODOLOGY

The NSRC questionnaire was originally based on the United States Association of University Technology Managers licensing survey. It was then modified to include recommendations of the former Coordination Committee on Science and Technology (CCST) Working Group on Metrics of Commercialisation report.¹⁷

Following the fourth iteration of the survey (NSRC 2005-2007), an advisory group was formed of key stakeholders to provide advice on the direction of the survey. As a result of its advice some survey questions were expanded or deleted and a small number of new questions were introduced. None of the existing time series contributing metrics were removed or redefined, however, some of the questions were disaggregated to allow the capture of more detailed information.

The survey's administrators continue to draw upon reliable third party data to reduce respondent burden and enhance data comparability wherever possible, including data for the CRCs drawn from the CRC Management Data Questionnaire (MDQ).

¹² Australian Research Council et al. (2002) National Survey of Research Commercialisation: Year 2000, Available at: www.arc.gov.au/pdf/AURC003.pdf

¹⁷ Coordination Committee on Science and Technology. 2005. Metrics for Research Commercialisation: A Report to the Coordination Committee on Science and Technology. Canberra: Department of Education, Science and Training. p.12. Available at: http://www.dest.gov.au/NR/rdonlyres/E3170A75-79D5-4737-955E-BE41714948E8/16499/FinalMoCReport15April2006.pdf

2. RESULTS

The results presented **in blue** below are for all institutions responding to the NSRC for 2008 and 2009. Time series data are presented **in green** for a subset of institutions that consistently responded to the NSRC between 2000 and 2009.¹⁸ Notes on the survey methodology can be found in Chapter 5.

INTELLECTUAL PROPERTY ACTIVITY

INVENTION DISCLOSURES

An invention disclosure occurs when a device, material, or method that is novel and useful is made known to the area responsible for technology transfer within the institution. This is usually the first step in enabling the evaluation of commercial potential before deciding to secure intellectual property rights.

Procedures for recording invention disclosures vary from institution to institution. A disclosure might either be recorded early in the evaluation process or not recorded until sufficient investigation is undertaken to confirm that the technology is novel and has commercial potential. A number of institutions covered in the survey (such as CSIRO) have a decentralised approach to commercialisation with divisions/ departments of the institution monitoring invention disclosures and applying for IP protection without oversight by a central office.

KEY POINTS

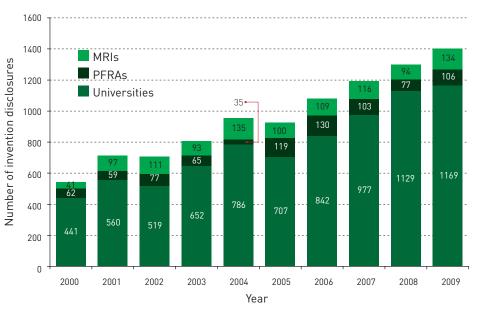
DATA FOR 2008-09

 The total number of invention disclosures increased by 24% from 1,206 in 2007 to 1,498 in 2009 (see Table 5).

TIME SERIES DATA FOR 2000-09

The time series data indicates that between 2000 and 2009 the overall number of disclosures has close to tripled, from 544 to 1,409 for the time series cohort, with all institution types making significant contributions to this increase (see Figure 1).





PATENT AND PLANT BREEDER RIGHTS: APPLICATIONS, ISSUES AND HOLDINGS

A patent is a right granted for any device, substance, method or process which is new, inventive and useful. Plant breeder's rights are exclusive commercial rights to a registered variety of plant to reproduce and stock the plant material for sale, import and export.

Patents and plant breeder rights establish legally enforceable protection of rights over intellectual property associated with inventions. They provide surety and security of ownership as a basis for any investment in commercialising inventions. The number of patent and plant breeder rights applications and the number issued indicate the level of production of new knowledge that has the potential for commercial application.

¹⁸ Consequently the two datasets cannot be directly compared as the time series will always be smaller than the full dataset.

Table 5: Invention disclosures in 2008 and 2009

		CSIR	CSIRO		Other PFRAs			MRIs	i -	Total	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	36	36	30	30	71	71
Invention disclosures received	No.	67	96	42	41	1,146	1,199	127	162	1,382	1,498

Table 6: New Intellectual Property protection applications filed in 2008 and 2009

		CSIRC)	Other PFF	RAs	Universit	ies	MRIs		Total	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	36	37	30	30	71	72
Institutions filing no applications	No.	0	0	1	1	7	7	11	12	19	20
Provisional Patents	No.	88	96	8	31	269	249	68	57	433	433
PCT patents	No.	0	0	1	27	157	131	22	24	180	182
Innovation Patents	No.	0	0	0	0	1	2	0	0	1	2
National Phase	No.	0	0	28	59	275	376	57	88	360	523
Divisionals	No.	0	0	0	0	15	17	6	1	21	18
Plant Breeder Rights	No.	0	0	0	0	11	12	0	0	11	12
Registered Designs	No.	0	0	0	0	0	2	0	0	0	2
Trademarks	No.	0	6	3	3	33	45	11	5	47	59
New Other IP rights filed	No.	0	0	0	0	9	3	0	0	9	3
Total	No.	88	102	40	120	769	837	164	176	1,061	1,234

A standard national phase patent gives protection and control over an invention for up to 20 years. Before embarking on a national phase patent application in Australia or elsewhere, many institutions take out provisional patents, and/or seek protection through the Patent Cooperation Treaty (PCT) arrangements.¹⁹

An innovation patent is an Australian mechanism specifically designed to protect inventions for a period of eight years that do not meet the inventive threshold required for standard patents. Introduced in 2001 to stimulate innovation among small to medium businesses and local industry, the innovation patent is a relatively fast way to obtain protection for a new device, substance, method or process that may have a shorter commercial life than the standard 20-year patent. The utility of Innovation Patents is currently being reviewed by the Advisory Council on Intellectual Property.

KEY POINTS

DATA FOR 2008 AND 2009

- A small number of institutions account for the majority of patenting activity, most notably CSIRO, which filed the largest number of new applications for a single institution in the two survey years (190). In 2008 and 2009, 27% and 28% of institutions respectively reported no patent applications filed (see Table 6).
- Between 2007 and 2009, the number of patent and plant breeders rights applications filed by CSIRO fell from 359 to 102, while universities increased from 742 to 837 (see Table 6).
- The number of innovation patent applications filed by the entire research sector continues to be small indicating that its value continues to be questioned by the sector²⁰ (see Table 6).
- In 2009, the university sector had the highest proportion of new patent applications filed (66%), followed by the PFRAs (predominantly CSIRO) (19%) and then MRIs (15%) (see Table 7).
- - 19 The Patent Cooperation Treaty is an international treaty, administered by the World Intellectual Property Organization, between more than 125 countries. The PCT makes it possible to seek patent protection for an invention simultaneously in each of a large number of countries by filing a single international patent application instead of filing separate national or regional patent applications.
 - 20 Christie AF and Moritz SL [2004; Revised April 2005] Australia's Second-Tier Patent System: A Preliminary Review. Intellectual Property Research Institute of Australia Report No. 02/04.

- In 2009, 55% of total IP protection applications by the entire research sector were filed outside of Australia, although there were differences across the sector. In 2009, CSIRO had 39% of its total filings in foreign jurisdictions while MRIs had 76% of their total filings in foreign jurisdictions (see Table 8).
- The proportion of total patents being filed in Australia has increased 36% in 2007 to 45% in 2009. This is largely underpinned by a shift in CSIRO patent filing activity (see Table 7 and Table 8).
- The number of patents and plant breeder rights issued increased by 66% from 522 in 2007 to 866 in 2009. The rise of issues for patents and plant breeder rights is attributable to better reporting of this metric by the university sector (see Table 9).
- The total stock of patents and plant breeder's rights declined moderately from 2007 to 2009 from 11,237 to 10,422 (see Table 10). Reductions in CSIRO and MRI patent holdings, (11% and 21% respectively) since 2007 have been the largest contributors to the overall decline.
- In 2008 and 2009, CSIRO reported the highest number of patent family filings, issuances and holdings by a single institution. The institutional average number of patent family filings, issuances and holdings by sector, clearly shows the dominance of CSIRO in its patenting activity and potential of its IP holdings (see Tables 8, 9 and 10 and Figure 4).

TIME SERIES DATA FOR 2000-09

The number of patents and plant breeder rights issued worldwide to Australian PFROs continues to fluctuate, with a low of 273 in 2001 and a high in 2008 of 844. The drop in patents issued between 2005 and 2007 is notable (see Table 2 and Figure 3).

Table 7: Location of new patent and/or plant breeder rights applications filed in 2008 and 2009

		CSIRC	CSIRO		Other PFRAs		Universities		MRIs		ι
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	3	4	36	37	30	30	70	72
Filed in Australia	No.	75	78	13	59	369	369	61	62	518	568
Filed in the US	No.	13	15	4	28	93	96	47	40	157	179
Filed elsewhere	No.	0	3	20	30	230	279	40	69	289	381
Total	No.	88	96	37	117	692	744	147	171	964	1,127

Table 8: Location of total patent and/or plant breeder rights applications filed in 2008 and 2009

		CSIRO	CSIRO		RAs	Universi	Universities		MRIs		
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	3	4	36	37	30	30	70	72
Filed in Australia	No.	90	159	13	59	566	578	76	74	745	870
Filed in the US	No.	33	26	4	30	173	200	71	70	281	326
Filed elsewhere	No.	199	77	21	30	535	476	125	160	880	743
Total	No.	322	262	38	119	1,274	1,253	271	304	1,905	1,938
Patent families	No.	88	93	18	86	572	562	150	162	828	903

Table 9: Patent and plant breeder rights issued in 2008 and 2009

		CSIRO	CSIRO		FRAs	Universi	Universities		MRIs		
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	36	36	30	30	71	71
Issued in Australia	No.	26	22	4	3	117	103	22	24	169	152
Issued in the US	No.	15	17	3	3	43	53	10	14	71	87
Issued elsewhere	No.	145	135	20	9	435	444	27	39	627	627
Total	No.	186	174	27	15	595	600	59	77	867	866
Patent families	No.	107	106	12	12	223	212	37	40	379	370

		CSIRO	CSIRO		RAs	Univers	sities	MRIs		Total	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	3	4	37	37	29	29	70	71
Patents pending	No.	1,861	2,151	296	412	3,347	3,065	668	667	6,172	6,295
Patents issued	No.	2,073	1,568	160	177	1,986	1,860	496	522	4,715	4,127
Held - cumulative total	No.	3,934	3,719	456	589	5,333	4,925	1,164	1,189	10,887	10,422
Patent families	No.	1,063	1,005	96	203	1,400	1,383	417	407	2,976	2,998
Culled or lapsed	No.	408	752	74	17	687	818	134	189	1,303	1,776

Table 10: Total patent and/or plant breeder rights held and pending as at the last day of the reporting period (cumulative number) for 2008 and 2009

Figure 2: Number of new Australian and United States patent and/or plant breeder rights applications filed by sector 2000-09

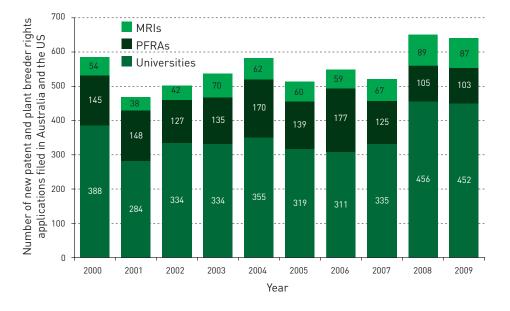
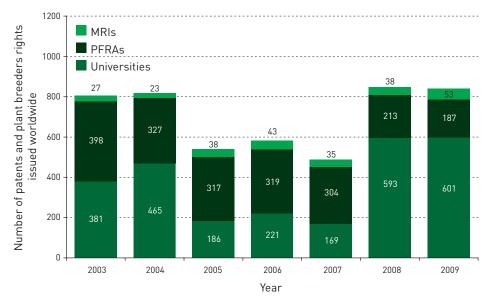


Figure 3: Patent and/or plant breeder rights issued worldwide by sector 2003-09²¹



21 Data pre-2003 is not represented as fields requesting patents filed in jurisdictions other than the US or Australia were not included in the survey instrument at the time.

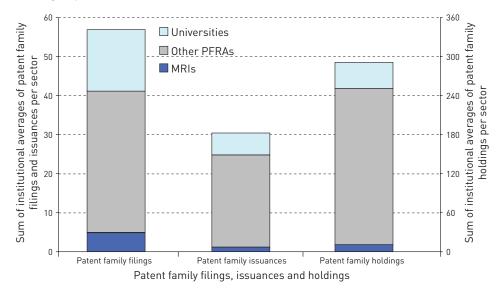


Figure 4: Sum of institutional averages of patent family filings, issuances and holdings by sector in 2009

LICENCES, OPTIONS AND ASSIGNMENTS (LOAs)

A licence agreement formalises the granting of IP rights between two parties where the owner of the IP (the licensor) permits the other party (the licensee) to access the rights to use the IP. An option agreement grants the potential licensee a time period during which it may evaluate the IP and negotiate the terms of a licence agreement. An assignment agreement conveys all rights, title and interest in and to the licensed subject matter to the named assignee.

The number and value of LOAs is an approximate measure of the value of IP created through research and development. Income from IP may have a long incubation period from when the original research was conducted, saying as much about institutions' research activity over the last five to ten years as it does about recent developments in commercialisation practices.

LOAs are a complex indicator representing more than just new technology generated from research institutions. LOAs are usually granted to external companies or partners to exploit IP developed in research institutions but they may also be used where a start-up company is being formed by the institution itself to exploit the invention. LOAs may be granted to develop a new technology but might also represent other intellectual assets such as professional development courses being licensed to other education-providers.

The gross income of LOAs is adjusted by excluding the LOA income paid to other institutions or commercial entities and in-kind contributions.

A Material Transfer Agreement (MTA) is a contract that governs the transfer of tangible research materials between two organisations, when the recipient intends to use it for his or her own research purposes. The MTA defines the rights of the provider and the recipient with respect to the materials and any derivatives. Biological materials, such as reagents, cell lines, plasmids and vectors, are the most frequently transferred materials, but MTAs may also be used for other types of materials, such as chemical compounds and even some types of software. Three types of MTAs are the most common at academic institutions: transfer between academic or research institutions, transfer from academia to industry and transfer from industry to academia.²²

Irrespective of whether there is a financial consideration associated with an MTA or not, MTAs are an indicator of linkages and potential collaborations.

KEY POINTS

DATA FOR 2008 AND 2009

- Although the income from MTAs is relatively small (\$300k in 2009), 928 MTAs were entered into by the research sector in 2009. Some of these MTAs are a consequence of existing collaborations, while others will lead to future collaborations and linkages between organisations (see Table 11).
- As with patenting, a small number of institutions account for the majority (up to 75%) of LOA activity.²³ In 2008 and 2009, 28% and 30% of responding institutions respectively reported no active LOAs (see Table 12).
- Adjusted gross LOA income for the publicly funded research sector increased 47% between 2007 (\$214m) and 2009 to \$315m (see Table 12). Reported LOA income levels have been highly variable over the last four years, with two years peaking at much higher than trend levels. This can be due to the impact of one or more technologies in the reporting period. For instance, the 2009 result is reflective of CSIRO's success with patent infringement prosecutions of their WLAN technology.

²² http://www.soi.berkeley.edu/guide/mtaquick.html

²³ Based on unit record data.

19

- While the number of active LOAs increased slightly, the proportion of active LOAs yielding income declined from 44% in 2007 to 38% in 2009 (see Table 12).
- As previously noted, the majority of LOA agreements involve small amounts of income. In 2009, almost two thirds of all income-yielding LOAs were for amounts less than \$50,000 (see Figure 12).

Table 11: Material Transfer Agreements

		CSIR	CSIRO		Other PFRAs		Universities		MRIs		al
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Number of institutions responding	No.	1	1	3	3	31	31	28	29	63	64
Number of MTAs entered into	No.	25	87	2	2	266	342	444	497	737	928
Income derived from MTAs executed	\$'000	28	166	0	0	29	116	35	20	92	302

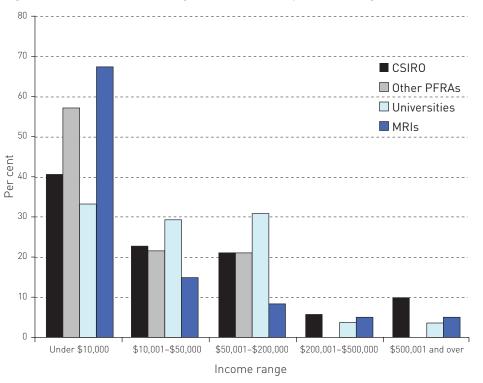


Figure 5. Distribution of LOA agreements value by income range in 2009

Table 12: Number of, and income from, licences, options and assignments (LOAs) in 2008 and 2009

		CSIRO		Other PFR	As	Universiti	es	MRIs		Total	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Number of institutions responding	No.	1	1	4	4	37	37	29	29	71	71
Number of institutions reporting no active LOAs	No.	0	0	1	1	8	9	11	11	20	21
Number of LOAs executed and active											
Licences executed	No.	109	102	22	16	158	139	86	87	375	344
Options executed	No.	0	0	0	0	44	64	8	8	52	72
Assignments executed	No.	0	0	2	5	39	63	17	24	58	92
LOAs executed	No.	109	102	24	21	241	266	111	119	485	508
Licences active	No.	424	470	102	101	668	740	201	227	1,395	1,538
Options active	No.	0	0	0	0	62	86	12	18	74	104
Assignments active	No.	0	0	16	21	81	110	45	65	142	196
LOAs active	No.	424	470	118	122	811	936	258	310	1,611	1,838
LOAs executed by type of company											
Executed with Australian owned and based companies	No.	109	102	2	1	124	124	86	80	321	307
Executed with Australian owned and foreign based companies	No.	0	0	0	0	0	1	0	0	0	1
Executed with foreign owned and Australian based	No.	0	0	0	0	5	13	5	13	10	26
Executed with foreign owned and foreign based companies/ organisations	No.	0	0	0	0	80	66	18	24	98	90
Executed with companies / organisations where the location/ownership is unknown	No.	0	0	22	20	32	62	2	2	56	84
Number of income yielding LOAs by type											
Running Royalties	No.	123	154	11	11	127	141	50	56	311	362
Cashed in equity	No.	3	11	0	0	3	3	2	4	8	18
Other types	No.	75	83	5	3	175	174	65	62	320	322
LOAs yielding income	No.	201	248	16	14	305	318	117	122	639	702
Proportion of LOAs yielding income	No.	47%	53%	14%	11%	38%	34%	45%	39%	40%	38%

		CSIR	D	Other PF	RAs	Univer	sities	MRI	s	Tota	ι
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
LOA income ('\$000)											
Running Royalties	\$'000	8,343	17,245	1,288	497	47,030	38,452	22,164	21,257	78,825	77,451
Cashed in equity	\$'000	3,848	14,058	0	0	802	521	10	20	4,660	14,599
Other	\$'000	1,871	207,859	138	30	24,110	18,014	2,275	887	28,394	226,789
Gross income	\$'000	14,062	239,162	1,426	526	71,942	56,986	24,450	22,163	111,880	318,838
Income reported as paid to other entities	\$'000	1,631	183	0	0	2,175	2,729	1,986	1,081	5,792	3,993
Adjusted gross LOA income	\$'000	12,431	238,979	1,426	526	69,767	54,257	22,464	21,082	106,088	314,844
Income from LOAs			·								
<10,000	No.	90	100	7	8	91	99	80	82	268	289
10,001 to 50,000	No.	47	56	3	3	70	78	13	18	133	155
50,001 to 200,000	No.	35	52	4	3	106	104	9	10	154	169
200,001 to 500,000	No.	11	14	1	0	14	15	7	6	33	35
500,001 and over	No.	18	26	1	0	24	22	8	6	51	54

TIME SERIES DATA FOR 2000-09

- Overall, the number of LOAs executed per year has increased by 19% during the 10 years over which the NSRC has been conducted, primarily due to increased activity from the MRIs. The sharp drop in the number of LOAs executed by the university sector in 2008 is possibly a reflection of the impact of the GFC, with the 2009 figure showing an improvement (see Figure 6).
- The number of LOAs yielding income shows a similar trend as the number of executed LOAs, with a drop in 2008, while the 2009 figure again shows a slight increase (see Figure 7).
- In constant 2009 prices, overall adjusted gross LOA income has increased by 118% from \$137m in 2000 to \$299m in 2009 (see Figure 8). The 2009 figure is dominated by CSIRO's WLAN technology income, which masks the 25% drop in LOA income from the universities.

- The impact of the global financial crisis would seem to be apparent in the adjusted LOA income figures for universities, which has fallen to \$54m in 2009 following a peak of \$187m in 2007 (see Figure 8).
- Income earned by MRIs per LOA yielding income has declined over the last four years, from \$130k in 2006 in adjusted terms, to \$53k in 2009. This result for MRIs is reflected by falls in total income earned from LOA agreements (see Figure 8).
- The number of LOAs executed per year by universities has remained fairly constant between 2000 and 2009, with a high of 314 in 2007 and a low of 179 in 2001 (see Figure 6).
- For the PFRAs, the number of LOAs yielding income has remained high by reference to the university sector, averaging approximately 80% of that reported for all universities between 2000 and 2009 (see Figure 7). This outcome points to the importance of CSIRO as a contributor to research commercialisation throughout the last decade.

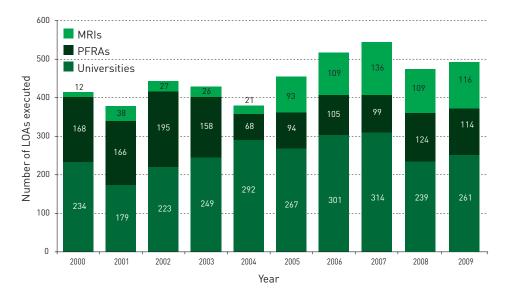


Figure 6: Number of LOAs executed by sector 2000-09

Figure 7: Number of LOAs yielding income by sector 2000-09

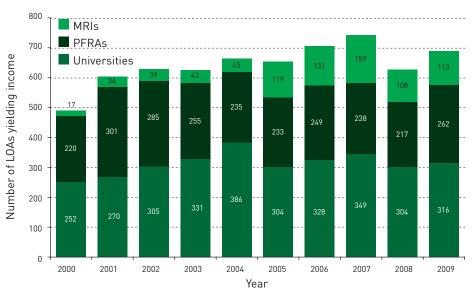
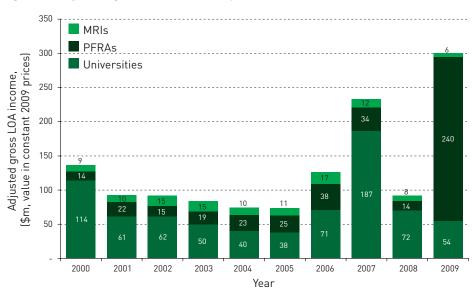


Figure 8: Adjusted gross LOA income by sector 2000-09



START-UP COMPANY ACTIVITY

Start-up company formation has been a significant avenue for commercialisation for Australian research institutions and can showcase the impact that publicly funded research can have on Australia's economy and society. The number, capital raising and value of institutional equity in start-up companies are intermediate measures of the business value generated from IP. Start-up companies are engaged in activities initially based on the licensing or assignment of IP from research institutions. Due to the need for the access to finance, this avenue for commercialisation was (and remains) very exposed to the impact of the GFC.

A list of start-up companies formed by PFROs in 2008 and 2009 can be found in Appendix 4.

KEY POINTS

DATA FOR 2008 AND 2009

- Capital raising for research commercialisation activities declined from \$199m in 2007 to \$138m in 2009. In 2008, only \$67m was raised (see Table 13).
- Only MRIs reported any Initial Public Offering (IPO) activity in 2008. Universities were most active in capital-raising being responsible for 65% and 53% of total financing over the two years of the survey (see Table 13).
- In 2007, four IPOs generated \$94m in capital, however, over the two year survey period one IPO raised only \$5.3m (see Table 13).
- In 2009, the research sector held equity in 91% of operational start-up companies which were dependent on the licensing of IP from their host institutions for their initiation during the survey years (see Table 14).
- The value of institutional equity holdings for the research sector increased from \$196m in 2007 to \$234m in 2009. This result was particularly encouraging in the face of widespread write downs in company values over the period and suggests the overall competitiveness of institutional investments. Between 2007 and 2009, the value of CSIRO's equity holdings increased from \$50m to \$82m, as did MRI equity holdings (\$18m to \$40m). The value of university equity holdings decreased from \$127m to \$112m over the same period (see Table 14).

TIME SERIES DATA FOR 2000-09

- The number of start-up companies formed each year for the research sector has decreased by 60% from 47 in 2000 to 19 in 2009 (see Figure 9), with a low of 14 in 2008.
- The total number of start-up companies operational with institutional equity increased from 69 in 2000 to 200 in 2007. However, the drop to 176 (2008) and 175 (2009), indicates the possible impact of the GFC on start-up company viability (see Figure 10).
- The value of institutional equity in start-up companies has increased by 31% from \$169m in 2000 to \$222m in 2009 (in adjusted 2009 dollars), suggesting an increasing capacity to launch and grow successful start-up companies within the sector. The 2009 figure is the second highest recorded over the last decade, only exceeded (by 4%) by the peak result recorded in 2004 (see Figure 11).

Figure 9: Number of new start-up companies formed per year by sector 2000-09

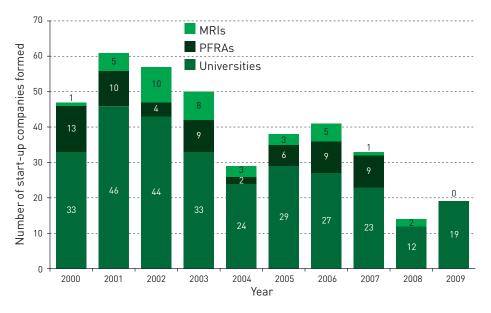


Table 13: Capital raising for research commercialisation activities in 2008 and 2009

		CSIRO	CSIRO		RAs	Univers	Universities		MRIs		าไ
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	35	35	30	29	70	69
Initial Public Offerings ²⁴	No.	0	0	0	0	0	0	1	0	1	0
	\$'000	0	0	0	0	0	0	5,300	0	5,300	0
Other	No.	6	7	0	0	25	36	3	2	34	45
	\$'000	7,615	58,523	0	0	43,337	73,604	10,929	6,036	61,882	138,163
Total Financing	No.	6	7	0	0	25	36	4	2	35	45
	\$'000	7,615	58,523	0	0	43,337	73,604	16,229	6,036	67,182	138,163

Table 14: Start-up company formation and equity positions in 2008 and 2009

		CSIRC)	Other Pl	FRAs	Univers	sities	MRI	s	Tota	ι
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	36	37	30	30	71	72
New start-up companies formed	No.	0	0	1	2	12	24	3	1	16	27
Institutions responding	No.	1	1	4	4	34	33	29	29	68	67
Value of all equity holdings	\$'000.	66,820	81,780	713	713	97,466	111,797	14,780	39,923	179,779	234,213
Institutions responding	No.	1	1	4	4	36	36	30	30	71	71
Equity holding positions fully or partially exited	No.	3	11	0	0	5	13	0	1	8	25
Value of equity holdings partially or fully exited	\$'000	3,848	14,058	0	0	1,850	5,129	0	0	5,698	19,187
Operational start-up companies which are dependent on licensing/assignment of technologies	No.	20	18	8	6	160	168	24	24	212	216
Start-up companies in which institutions have an equity holding	No.	20	18	7	6	146	152	19	20	192	196
Start-up companies dependent on licensing that ceased operations	No.	3	11	0	1	14	31	5	6	22	49
Gross percentage of start-up companies with an equity holding by an institution that are dependent on the same institution's IP	%	100%	100%	88%	100%	91%	90%	79%	83%	91%	91%

²⁴ An MRI reported initial public offerings in 2009 but did not report capital generated from those offerings.

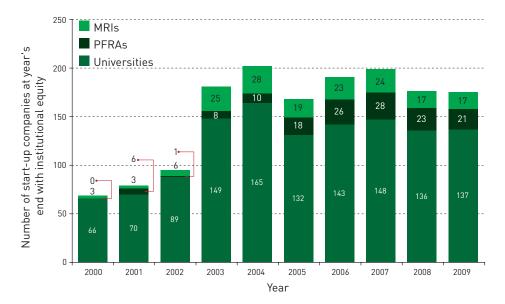
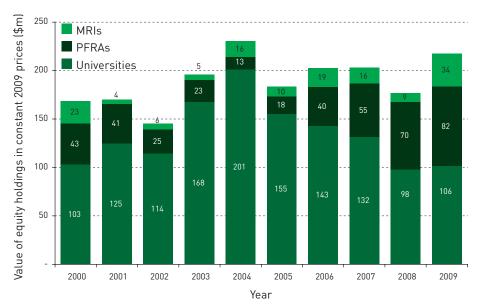


Figure 10: Number of start-up companies operational at year's end with institutional equity stake by sector 2000-09





RESEARCH CONTRACTS AND CONSULTANCIES AND DIRECT SALES

The number and value of research contracts and consultancy activity provide additional indicators of the impact of the Australian research institutions beyond the income received for the direct commercialisation of their IP. Direct sales were introduced as a new metric for the first time in this survey. The purpose of this metric is to capture income directly earned by institutions that commercialised the results of their research direct to market without licensing their IP. It was grouped with research contracts and consultancies despite being a more conventional indicator of commercialisation because it is a form of revenue earned without patenting, as is the case with contract research and consultancies. Direct sales measures physical products produced by the reporting institution which embody technology-based IP (including both formally secured IP and know-how).

Contract research is usually a bilateral relationship between a research institution and an external client where the institution provides a research service with objectives set by the client.

Consultancy on the other hand is the innovative application of existing knowledge and can often provide more immediate solutions for clients in need of knowledge other than formal contract research. The problem-solving approach of researchers can be translated into immediate economic benefit because similar problems may have been faced before, perhaps by a different client in the same sector or a client in a different sector.

Income represented in research contracts includes contracts with partners in grant funded research but does not include funding from the granting agency itself. Income reported may also include public sector contracts won by tender. Research contracts and consultancies serve as a useful proxy for the value and impact of knowledge exchange, collaboration between research and industry sectors, and other related activities which impact on the economy and society.

KEY POINTS

DATA FOR 2008 AND 2009

- The total number of research contracts and consultancies executed remained steady between 2007 and 2009, at just over 14,000. The total value of research contracts and consultancies declined by 10% from \$1.35b (in adjusted terms) in 2007 to \$1.22b in 2009 (see Table 15).
- For the first time this NSRC survey measured the value of direct sales. This was recorded as \$27m for 2009, with almost all of that value consisting of activity undertaken by the university sector and CSIRO.
- The results indicate that the value of contracts to the university sector greatly exceeds that of consultancies and direct sales and MRIs execute a negligible number of consultancies and direct sales.
- For 2009, most research contracts and consultancies were of low value. Over 75% of contracts and consultancies were for amounts less than \$50,000 and 46% for amounts less than \$10,000 (see Figure 12). The results for 2009 are presented in Figure 12. The results are similar for 2008, but are not shown.

Table 15: Research contracts, consultancies and direct sales number, and value in 2008 and 2009

Research Contracts

		CSIRO	CSIRO		RAs	Univers	ities	MRI	s	Tota	ι
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	35	34	28	28	68	67
Institutions reporting no contracts	No.	0	0	1	0	5	3	13	13	19	16
Contracts	No.	1,395	1,467	68	51	7,128	6,949	374	355	8,965	8,822
Value of contracts	\$'000	150,974	219,188	24,051	8,154	736,738	658,693	68,173	65,885	979,936	951,920
Gross contracted value											
\$0 - \$10,000	No.	703	634	5	4	2,590	2,634	59	45	3,357	3,317
\$10,001 - \$50,000	No.	333	385	19	18	2,255	2,220	116	119	2,723	2,742
\$50,001 - \$200,000	No.	216	272	24	18	1,188	1,264	130	116	1,558	1,670
\$200,001 - \$500,000	No.	83	101	11	4	436	373	51	47	581	525
>\$500,001	No.	60	75	9	7	210	210	18	26	297	318
Unspecified		0	0	0	0	449	248	0	2	449	250
Total	No.	1,395	1,467	68	51	7,128	6,949	374	355	8,965	8,822

Research Consultancies

		CSIRO		Other PF	RAs	Univers	sities	MR	ls	Tota	ıl
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	34	34	28	29	67	68
Institutions reporting no consultancies	No.	0	0	2	1	8	8	19	20	29	29
Consultancies	No.	753	791	338	1,409	3,096	3,222	140	153	4,327	5,575
Value of consultancies	\$'000	81,294	118,025	11,792	19,066	115,324	132,415	3,598	2,959	212,007	272,463
Gross consultancies value											
\$0 - \$10,000	No.	379	342	173	1,132	1,622	1,678	82	101	2,256	3,253
\$10,001 - \$50,000	No.	179	208	104	197	1,037	1,039	44	35	1,364	1,479
\$50,001 - \$200,000	No.	117	146	51	62	329	359	12	15	509	582
\$200,001 - \$500,000	No.	45	55	10	18	76	62	1	2	131	137
>\$500,001	No.	33	40	0	0	24	28	1	0	58	68
Unspecified		0	0	0	0	8	56	0	0	8	56
Total	No.	753	791	338	1,409	3,096	3,222	140	153	4,327	5,575

Direct sales

		CSIRO		Other PFR	As	Univers	ities	MRI	s	Tota	l
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	32	32	28	28	65	65
Institutions reporting no direct sales	No.	0	0	4	4	29	29	27	27	60	60
Direct sales transactions	No.	7,726	14,707	0	0	43	43	63	53	7,832	14,803
Value of direct sales	\$'000	10,718	20,937	0	0	5,244	6,193	177	123	16,138	27,252
Gross direct sales value											
\$0 - \$10,000	No.	7,555	14,329	0	0	41	41	63	53	7,659	14,423
\$10,001 - \$50,000	No.	152	341	0	0	0	0	0	0	152	341
\$50,001 - \$200,000	No.	17	37	0	0	1	1	0	0	18	38
\$200,001 - \$500,000	No.	1	0	0	0	0	0	0	0	1	0
>\$500,001	No.	1	0	0	0	0	0	0	0	1	0
Unspecified		0	0	0	0	1	1	0	0	1	1
Total	No.	7,726	14,707	0	0	43	43	63	53	7,832	14,803

Figure 12: Number of research contracts by range of contract value in 2009²⁵

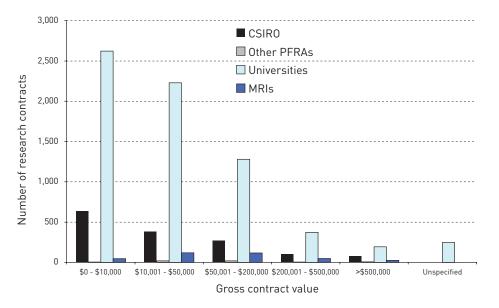
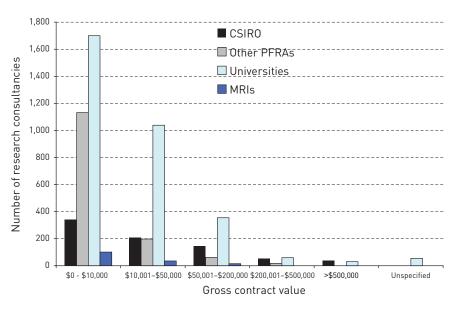


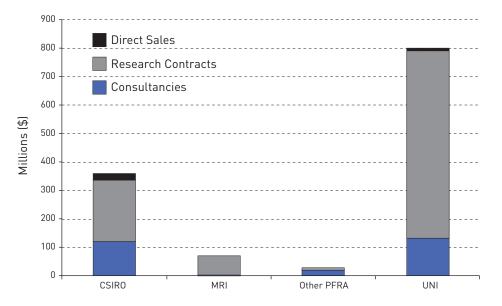
Figure 13: Number of research consultancies by range of contract value in 2009²⁵



25 A large number of university research contracts and consultancies were not reported by contract value (see Table 15).

NATIONAL SURVEY OF RESEARCH COMMERCIALISATION 2008 AND 2009

Figure 14: Value of research contracts, consultancies and/or direct sales executed by sector in 2009



SKILLS DEVELOPMENT AND KNOWLEDGE EXCHANGE ACTIVITY

Research institutions' efforts to realise their commercialisation potential through professional development and knowledge transfer activities are well documented. The NSRC sought information on educational, training and development programs aimed at research staff or higher degree research students to develop skills and understanding in entrepreneurship and research commercialisation processes. Information was also sought in relation to programs aimed at helping industry and other individuals and organisations to better understand the research process, research findings and their implications.

KEY POINTS

DATA FOR 2008 AND 2009

- In 2009 the percentage of institutions offering research commercialisation and entrepreneurship training to its staff and students either through in-house or external training, was 67%, which is consistent with earlier years (see Table 16).
- Participation by researchers and research students in research commercialisation training programs increased by 3% between 2007 and 2009 to 3,887 (see Table 16).
- For 2008 and 2009 for the first time the survey asked about institutional employees transferring to work for start-up companies. In 2008 and 2009, 66 and 115 Full-Time Equivalent (FTE) positions were reported respectively as having transferred from PFROs into start-up companies (see Table 16).
- The number of research postgraduates employed by start-up companies grew by 10% from 2007 to a level of 111 in 2009 (see Table 16). Interestingly, this occurred despite the sharp decline in number of start-up companies launched.

RESOURCES FOR RESEARCH COMMERCIALISATION

The commitment of institutions to capture commercial benefit from their research is indicated by staffing and other resources allocated by institutions to commercialisation activities. Commercialisation staff and administrative costs include the salaries and other associated costs of staff employed in commercialisation offices as well as the costs of legal and other fees incurred in commercialisation activities. Commercialisation and support staff may be employed within an office dedicated to commercialisation activities, a commercialisation company or in functional units within an institution.

KEY POINTS

DATA FOR 2008 AND 2009

- Twenty per cent of all institutions indicated they had no staff engaged in a dedicated commercialisation role or as commercialisation support staff (see Table 17).
- Dedicated and supporting commercialisation staff levels increased 43% from 2007 to 706 FTE positions in 2009 (see Table 17).
- For the first time, this survey asked respondents about dedicated legal, marketing and industry community engagement staff. In 2009, there were 130 FTE reported as industry community engagement staff, 31 FTE dedicated legal staff and 27 FTE dedicated marketing staff across the research sector (see Table 17).

 Net commercialisation costs, including marketing, legal, staff and non staff costs for 2009 were \$121m (see Table 17).

TIME SERIES DATA FOR 2000-09

Over the period from 2000 to 2009, the total level of dedicated commercialisation staff across all research institutions has increased by 62%. The level grew rapidly from 191 FTE in 2000 to 296 FTE in 2003 and has remained relatively stable to 2009 (309 FTE). The MRIs have shown significant relative growth during this period from a low base of 5 FTE in 2000 to 18 FTE in 2009 (see Figure 15).

		CSIRO		Other PF	-RAs	Univers	sities	MR	S	Tota	ι
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	37	37	30	30	72	72
Institutions offering in-house and/or external training	No.	1	1	3	3	32	32	12	12	48	48
Training offered to researchers and research students											
Institutions offering in-house training	No.	1	1	2	2	27	27	8	8	38	38
In-house training participants	No.	2	0	470	406	2,550	3,276	165	205	3,187	3,887
Institutions offering external training	No.	0	0	1	1	12	11	6	6	19	18
External training participants	No.	0	0	4	4	254	340	39	39	297	383
Institutional employment in start-up companies											
Research post-graduates employed in start-up companies	No.	45	37	4	3	54	59	15	12	118	111
Postdoctoral employed in start-up companies	No.	0	0	4	4	18	25	18	15	39	43
Academic staff employed in start-up companies	No.	0	0	0	0	7	8	3	5	9	13
Other institutional employees employed in start-up companies	No.	0	0	4	2	6	40	7	17	17	58
Total number of staff employed in start-up companies	No.	0	0	8	6	31	72	27	37	66	115

Table 16: Skills development and transfer in 2008 and 2009

Table 17: Commercialisation staff numbers and staff costs in 2008 and 2009

		CSIRO		Other PF	RAs	Universi	ties	MRIs		Total	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Institutions responding	No.	1	1	4	4	36	36	30	30	71	71
Institutions reporting no commercialisation staff	No.	0	0	0	0	2	3	12	11	14	14
Dedicated Commercialisation Legal Staff	No.	3	4	2	2	20	22	3	2	28	31
Dedicated Commercialisation Marketing Staff	No.	1	1	1	1	12	14	10	11	23	27
Dedicated commercialisation staff	No.	125	128	16	16	168	165	22	22	330	332
Industry Engagement Staff	No.	0	0	21	22	95	104	3	3	119	130
Other staff	No.	27	20	4	4	147	154	7	9	186	188
Commercialisation staff total	No.	156	153	44	45	442	460	44	48	685	706
Cost of dedicated legal staff	\$'000	450	600	255	305	2,645	3,067	335	273	3,685	4,246
Cost of dedicated marketing staff	\$'000	50	110	118	45	671	841	1,861	2,143	2,700	3,139
Cost of dedicated commercialisation staff	\$'000	20,122	19,500	2,385	2,484	21,795	21,349	3,265	3,556	47,567	46,888
Cost of dedicated industry/community engagement staff	\$'000	0	0	4,334	4,747	9,719	11,427	878	656	14,932	16,829
Cost of Other staff	\$'000	2,699	1,600	456	485	12,928	13,824	548	993	16,631	16,901
Cost of Commercialisation staff total	\$'000	23,321	21,810	7,548	8,065	47,759	50,508	6,887	7,620	85,516	88,003
External fees and legal costs	\$'000	52	9	42	45	1,079	1,153	478	569	1,651	1,776
Internal fees and legal costs	\$'000	0	0	57	23	3,751	4,352	1,149	1,294	4,957	5,669
Sub-total non-employment and non-legal costs	\$'000	52	9	99	68	4,830	5,505	1,627	1,862	6,608	7,444
IPR external fees and legal costs	\$'000	7,704	8,251	1,702	1,159	12,262	12,281	3,953	4,364	25,620	26,055
Revenue from licensees as reimbursement of expenses	\$'000	909	1,226	23	39	4,849	5,054	2,667	1,180	8,449	7,499
Net total other commercialisation staff costs	\$'000	6,846	7,034	1,777	1,188	12,243	12,732	2,913	5,046	23,779	26,000

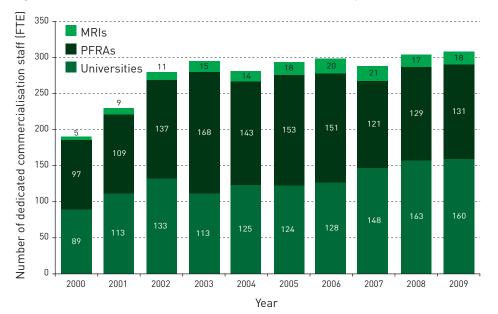


Figure 15: Number of dedicated commercialisation staff by sector 2000-09

3. COUNTRY COMPARISONS

In this chapter the commercialisation performance of Australian public institutions are compared with their international counterparts.

International comparisons are difficult to make because there are substantial scale, structural and systemic differences between each country's higher education and publicly funded research systems. There are also differences in legislation, industry structure, market characteristics and government policy. These factors all impact on the incentives and strategies for research commercialisation in each of these countries.

There are also differences in survey scope, methodology and definitions that make comparisons difficult. The comparisons set out below are based on survey data not census data. All surveys do not attempt to collect data from all public research institutions. Panel data for institutions that consistently responded to a survey are not available for all surveys for all years. This can introduce considerable variation between survey years depending on which major institutions responded to a survey.

This chapter therefore provides insights into the major areas of activity as reported by the institutions performing the majority of work in each country. Where significant variation exists this has been explained.

Research expenditure in US dollar Purchasing Power Parity terms is used to adjust commercialisation activity relative to the scale of funding inputs. This allows comparison of commercialisation activity between Australia, the United States (US), Canada, the United Kingdom (UK) and Europe more broadly.

The different classification of research expenditures between surveys generally underestimates Australia, UK and Europe's commercialisation outputs compared with the US and Canada.²⁶ This underestimate may be exacerbated by the fact that we are comparing the top 100 American universities (in terms of R&D expenditures) compared with all Australian public institutions, the majority of which have relatively low commercialisation outputs.

This report introduces for the first time comparisons between Australia and European public research institutions. The European data is derived from the *Association of European Science and Technology Transfer Professionals* (ASTP) survey, which is similar to the AUTM and NSRC surveys. The ASTP survey covers about 100 research institutions from up to 26 European countries. Where reported the ASTP data excludes UK institutions.

RESULTS

KEY POINTS

- The number of Full-Time Equivalents (FTE) dedicated to research commercialisation by Australian institutions has remained stable at around 4.0 FTE since 2000 (see Figure 16). These levels are similar to the US (average of 4.5) and Canada (average of 4.3) but are significantly less than Europe (average of 8) and the UK (average of 8.2). Unlike Australia, institutions from other countries are increasing their number of commercialisation FTE and are therefore expected to increase their outputs in the future.²⁷
- The number of invention disclosures per \$US100m research expenditure by Australian institutions has averaged 24 since 2000 (see Table 3). Australian levels of disclosure are similar to institutions across Europe (average of 29) but significantly lower than the US (average of 41) (see Figure 17). The averages of invention disclosures for Canada and the UK are also significantly higher, at 44 and 50 respectively for reported years.
- Figure 18 compares patents granted to public research institutions by the United States Patent and Trademark Office (USPTO) to varying countries between 2003 and 2009. US patenting is the most consistently reported figure between countries. In the early 2000s the number of US patents issued to Australian institutions per \$US100m research expenditure oscillated between 2 and 5 (see Table 3 and Figure 18).

²⁶ Arundel A & Bordoy C (2010) Developing internationally comparable indicators for the commercialisation of publicly funded research, UNU-MERIT, Maastricht, Netherlands.

²⁷ Arundel A & Bordoy C (2010) Summary Respondent Report: ASTP Survey for Fiscal Year 2008, UNU-MERIT and Association of European Science and Technology Professionals, Maastricht, Netherlands. The authors demonstrate that additional commercialisation FTEs have a significant positive effect on research commercialisation outcomes.

- More recently the number of US patents issued to Australian institutions per \$US100m research expenditure has dropped to 1.5 in 2009. Not surprisingly, the US rate of patenting with the USPTO is higher (6.6 in 2009) than that of other countries. The US and Canada continued to display a decline in issued US patents per research expenditure from 2000 and 2009 (see Table 3). For Australia, the US and Canada these declining rates are the result of increased aggregate research expenditures with stable or declining aggregate patenting in the US. Although the data only covers three years for European institutions the data shows a significant increase in 2008 to 4.3 US patents per \$US100m research expenditure.
- The number of Licences, Options and Assignments (LOAs) executed per \$US100m research expenditure by Australian institutions has declined from 15 in 2000 to 9 in 2008 and 2009 (see Table 3). Canadian LOAs executed that have remained relatively constant (average 15) between 2000 and 2008. After a large drop in 2001, the number of US LOAs has slowly declined to 10 LOAs per \$US100m research expenditure between 2001 and 2009.
- European LOA executions have dropped from 16 LOAs per \$US100m research expenditure in 2005, to 9 in 2008. The UK data (derived from the HE BCI survey) shows a dramatic increase in LOAs executed in 2004 and has maintained (and increased) its LOA levels through to 2008, greatly exceeding Australia, Canada and the US, at an average of 35 LOAs executed per \$US100m research expenditure over the 2003 to 2008 period. The HE-BCI report shows that the 2004 jump is from two Higher Education Institutions licensing predominantly to non-commercial organisations. The report acknowledges that the rapid increase could be a consequence of better reporting as well as an increase in the level of licensing activity.²⁸

- Australia's LOA income as a percentage of research expenditure, although variable over the years because of large single successes, compares favourably with other countries (see Table 3 and Figure 20). Between 2000 and 2009, Australia's average LOA income as a percentage of research expenditure is 2.2%. The US has a significantly higher average rate of return at 4.7%. The Canadian results show a gradual decline from a peak of 2.3% in 2001 to 1.1% in 2008. The UK has displayed a gradual increase from a low base in 2003 of 0.6% to 0.8% in 2008 (see Table 3 and Figure 20).
- Australian start-up companies formed per \$US100m research expenditure have gradually declined from a peak of 2.2 in 2001 to 0.8 in 2009 (see Table 3 and Figure 21). All countries, except Europe, have reduced the rate of start-up company formation since the early 2000s. The US declined in 2002 and has subsequently remained constant (~1.1). Canada declined from the high level of 3.8 in 2000 to 0.9 in 2008. The UK and Europe have maintained a higher rate of start-up company formation than other countries over most measurable years.

28 Higher Education Funding Council for England (2009) Higher Education – Business and Community Interaction Survey 2003-04. Policy Development Report on survey July 2009/25, HEFCE, Bristol, UK. Available at www.hefce.ac.uk

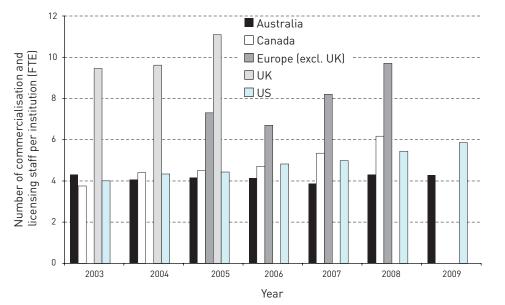
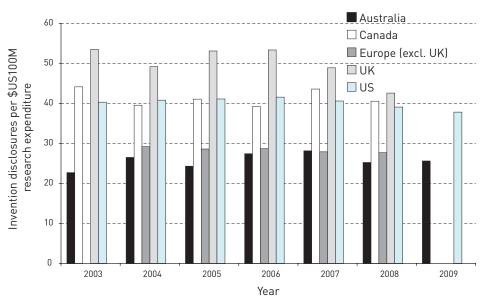


Figure 16: International comparison of average numbers of commercialisation and licensing staff (FTEs) per institution, 2003-09²⁹

Figure 17: International comparison of the number of invention disclosures per \$US100m research expenditure, 2003-09



²⁹ Staff numbers are licensing full time equivalents (FTEs) only and do not include other staff who may support commercialisation activities. Data relates only to those institutions that had some commercialisation staff or commercialisation activity in the period.

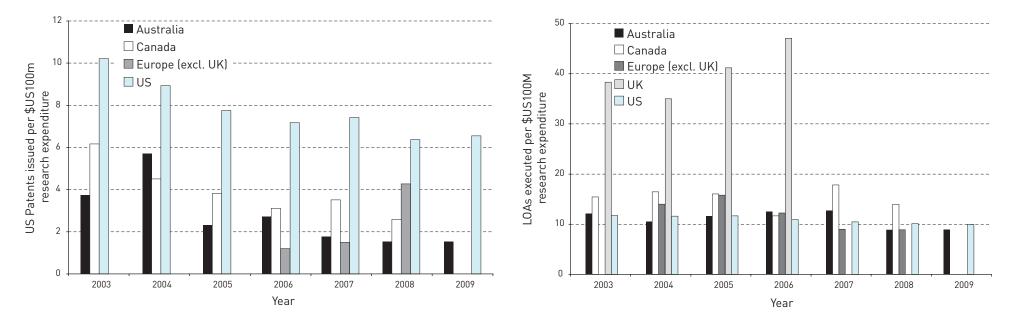


Figure 19: International comparison of the number of LOAs executed per

\$US100m research expenditure, 2003-09

Figure 18: International comparison of the number of US patents issued per \$US100m research expenditure, 2003-09

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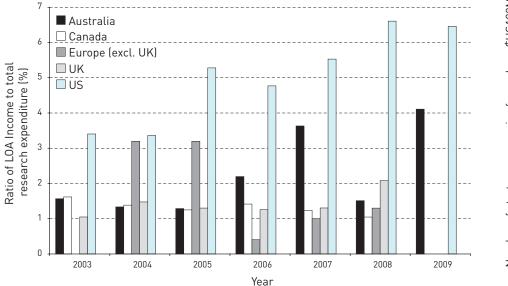
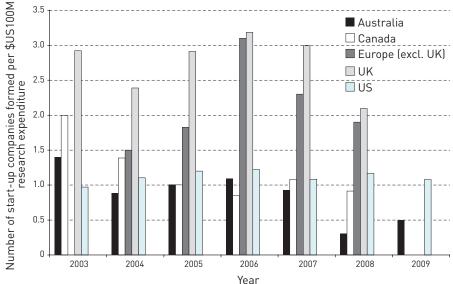


Figure 20: International comparison of LOA income as a percentage of research expenditure, $2003-09^{30}$

Figure 21: International comparison of start-up companies formed per \$US100m research expenditure, 2003-09



³⁰ The dramatic increase in later years is due to a few major transactions. University of Queensland reported income of \$21m in 2006 and \$45m in 2007. Monash University reported LOA income of \$101m in 2007. CSIRO reported an LOA income of \$239m in 2009.

4. COOPERATIVE RESEARCH CENTRES (CRCs)

The CRC Program was established in 1990 by the Australian Government to encourage collaboration in Research and Development (R&D) between the private sector and public sector research bodies. The CRC program also achieves concentration of world-class research teams and has a strong education component with a focus on producing graduates with industry relevant skills.

CRCs enhance Australia's industrial, commercial and economic growth through the development of sustained, user-driven, cooperative public-private research centres that achieve a high level of outcomes in utilisation.

Over the period of the survey, CRCs operated in four broad industry sectors the *Agriculture, Forestry and Fishing* industry; the *Manufacturing* industry; the *Mining* industry; and the *Services* sector.³¹ These industry sectors represent a contraction of the previous six classifications used by the program. Data has been transposed according to the new classifications.

This chapter presents data from the CRC Management Data Questionnaire (MDQ) from 2005-06 to 2008-09. MDQ data was not combined with NSRC data as there is potential for outputs shared between CRCs and other institutions included in the NSRC to be counted more than once. All dollar values are as reported for the relevant year in Tables 19-26. All dollar values in the figures have been converted to 2009 prices to enable comparisons over time.³² It is important to note that between 2005-06 and 2008-09, the number of CRCs has declined (see Table 18). In some cases these declining numbers may explain reductions in commercialisation activities. For this reason the data is presented as a proportion of research expenditure.

Table 18: Numbers of Cooperative Research Centres, 2005-06 to 2008-09

	Number	of Cooperati	ve Research	Centres
Industry Sector	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	21	18	19	16
Manufacturing	9	5	6	5
Mining	4	4	4	3
Services	32	26	27	22
Total	66	53	56	46

RESOURCING FOR COMMERCIALISATION

KEY POINTS

DATA FOR 2008-09

- Total CRC research expenditure since 2005-06 has declined by 23% (in part due to a decline in the number of CRCs) with a greater proportion of overall funds have been allocated to commercialisation. Total CRC program expenditure on commercialisation has increased from just under \$82m in 2005-06 to nearly \$90m per annum in 2008-09 (see Table 19).
- Overall, CRC commercialisation expenditure as a proportion of research expenditure for all CRCs increased from 12% in 2005-06 to 17% in 2008-09 (see Table 19 and Figure 22). Commercialisation expenditure in the *Manufacturing* industry has remained steady, while the *Mining* industry and *Services* sector have increased their proportion of commercialisation expenditure.

³¹ These categories have changed to align with ANZSIC codes.

³² All dollar values presented are expressed in constant 2009 prices using the implicit price deflators for Gross Domestic Product from the Australian System of National Accounts. Specifically, the deflators used were 1.044 for 2008-09, 1.0917 for 2007-08, 1.149 for 2006-07 and 1.205 for 2005-06

Table 19: CRC research and commercialisation expenditure, 2005-06 to 2008-09

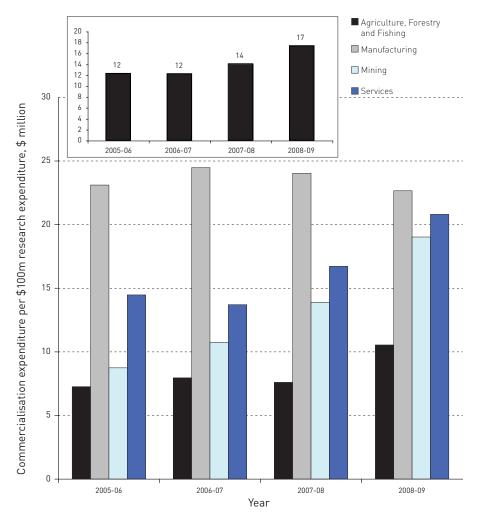
										Commercia	lisation exp	. as a perce	ntage of
	Commerc	ialisation ex	kpenditure ((\$'000)	Rese	arch Expen	diture (\$'00	0)		r	esearch exp	penditure	
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09	2008-09*	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	15,893	17,288	15,034	18,476	218,799	217,128	197,979	175,382	183,071	7.3%	8.0%	7.6%	10.5%
Manufacturing	10,758	10,677	10,531	10,239	46,547	43,623	43,838	45,183	47,164	23.1%	24.5%	24.0%	22.7%
Mining	4,840	6,414	8,411	7,030	55,313	59,674	60,496	36,955	38,575	8.8%	10.7%	13.9%	19.0%
Services	50,253	44,925	52,006	53,421	347,266	327,863	311,077	256,869	268,130	14.5%	13.7%	16.7%	20.8%
Total	81,744	79,304	85,982	89,166	667,925	648,288	613,390	514,389	536,941	12.2%	12.2%	14.0%	17.3%

* For the purposes of comparing this table with other areas of this report, an extra column showing the conversion of the 2008-09 research figures in 2009 dollars has been included

Table 20: CRC patent filing activity, 2005-06 to 2008-09

					Pa	atents filed	(No.)					
		In Austr	alia			Overse	as			Total		
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	24	20	21	9	19	11	13	13	43	31	34	22
Manufacturing	16	11	30	13	1	8	16	5	17	19	46	18
Mining	8	21	21	7	11	0	12	2	19	21	33	9
Services	26	30	16	23	26	36	11	16	52	66	27	39
Total	74	82	88	52	57	55	52	36	131	137	140	88

Figure 22: Commercialisation expenditure per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Commercialisation expenditure per \$100m research expenditure for all CRCs over the same period.



INTELLECTUAL PROPERTY PROTECTION ACTIVITY

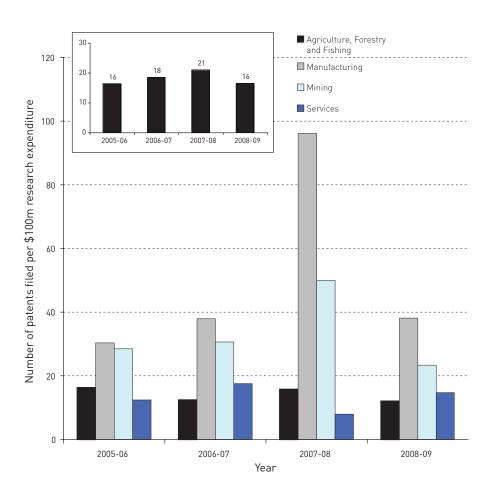
KEY POINTS

DATA FOR 2008-09

- Patent filing activity increased by 7% from 131 in 2005-06, to 140 in 2007-08 as a result of increases in domestic patenting, however, 2008-09 has seen total patent filing activity drop to 88 (see Table 20).
- The total number of patents filed by all CRCs increased from 16 patents per \$100m research expenditure in 2005-06, to 21 in 2007-08. The number returned to its 2005-06 levels in 2008-09 (see Table 3 and Figure 23 inset). Growth in patent filings in the intervening years predominantly came from the *Mining* and the *Manufacturing* industries (see Figure 23).
- Patent filings by the Agriculture, Forestry and Fishing industry have sharply declined, although its patent holdings have remained steady. The Manufacturing industry's patent filings have returned to previous levels, having increased in the 2007-08 financial year (see Table 20 and Table 21).
- The total number of patents maintained by CRCs in Australia and overseas declined between 2005-06 and 2008-09 by 28% and 22%, respectively. CRCs maintained a total of 181 patents in Australia and 492 overseas in 2008-09 (see Table 21).
- The total number of patents maintained per \$100m research expenditure by CRCs declined from 109 in 2005-06, to 99 in 2007-08 but has increased to 125 in 2008-09 and is accounted for by strong growth in the *Mining* industry (see Table 21 and Figure 24).
- There were significant increases in the patent holdings of the *Mining* industry in 2007-08 due in part to CRC Mining Australia that maintained 24 patents in Australia and 171 patents overseas (see Table 21).
- The number of Licences, Options and Assignments (LOAs) executed by CRCs has increased 300% from 74 in 2005-06, to 222 in 2008-09 (see Table 22).
- Earnings from LOAs amounted to a total of \$82m between 2005-06 and 2008-09, dominated by earnings from the *Services* sector (\$78m) (see Table 22 and Figure 25).
- Income derived from LOA activity per \$100m research expenditure increased from \$2.7m in 2005-06, to \$5.3m in 2008-09 (see Figure 25 inset).

Figure 23: Total number of patents filed per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Total number of patents filed per \$100m research expenditure for all CRCs over the same period.

Figure 24: Total number of patents maintained per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Total number of patents maintained per \$100m research expenditure for all CRCs over the same period.



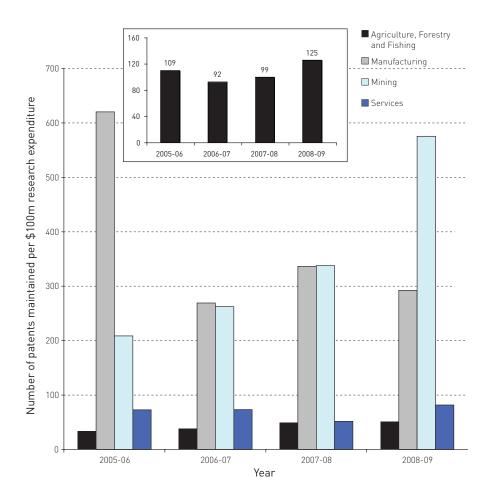


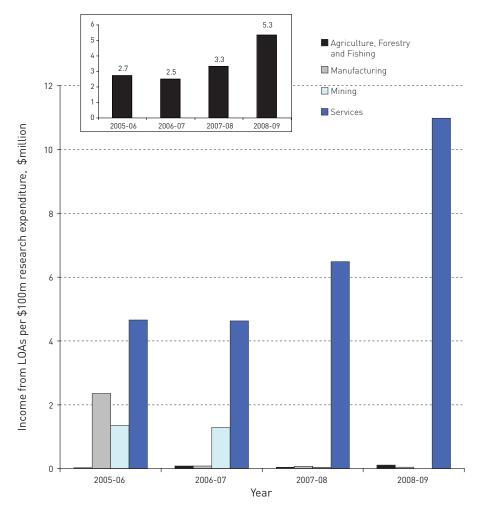
Table 21: CRC patent holdings, 2005-06 to 2008-09

					Pa	tents maint	ained (No.)					
		In Austr	alia			Overse	eas			Tota	ι	
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	36	45	41	37	52	50	65	57	88	95	106	94
Manufacturing	91	34	42	38	257	101	119	100	348	135	161	138
Mining	21	42	41	31	118	138	182	191	139	180	223	222
Services	102	92	77	75	203	184	99	144	305	276	176	219
Total	250	213	201	181	630	473	465	492	880	686	666	673

Table 22: CRC licences, options and assignments activity, 2005-06 to 2008-09

		Number of L	0As			LOA income (\$'000)	
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	14	18	17	34	56	180	72	188
Manufacturing	24	15	20	22	1,095	35	31	19
Mining	2	2	3	8	750	770	7	0
Services	34	97	62	158	16,164	15,157	20,168	26,960
Total	74	132	102	222	18,065	16,142	20,278	27,167

Figure 25: Income from licences, options and assignments (LOAs) per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09³³ Inset figure:</sup> Income from LOAs per \$100m research expenditure for all CRCs over the same period.



START-UP COMPANY ACTIVITY

KEY POINTS

DATA FOR 2008-09

- A total of 22 start-up companies were formed by CRCs between 2005-06 and 2008-09, earning CRCs an income of \$1.5m from sources such as royalties, contributions and realised equity (see Table 23). No income was reported for 2007-08 and income for 2008-09 totals \$12,000. The decline in the number of CRC start-up company formation clearly reflects research sector trends both nationally and internationally (see Table 23).
- Income from aggregate CRC start-up company activity declined from \$118,000 per \$100m research expenditure in 2005-06, to \$0 in 2007-08 and \$2,000 per \$100m research expenditure in 2008-09 (see Figure 27).

³³ Note that throughout this CRC chapter the absence of a column in any figure indicates a zero result rather than a non-response.

		New start-up com	panies (No.)		Income received from start-up companies (\$'000)						
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09			
Agriculture, Forestry and Fishing	0	0	0	0	16	20	0	12			
Manufacturing	2	0	1	0	0	0	0	0			
Mining	2	0	0	0	618	0	0	0			
Services	7	6	1	3	155	661	0	0			
Total	11	6	2	3	789	681	0	12			

Table 23: CRC new start-up companies formed and income received, 2005-06 to 2008-09

Figure 26: Number of new start-up companies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09³³ Inset figure: Number of new start-up companies per \$100m research expenditure for all CRCs over the same period.

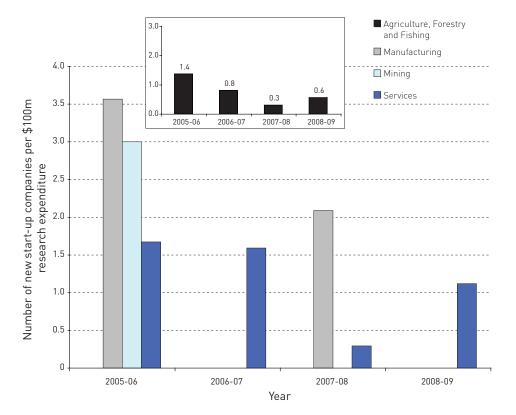
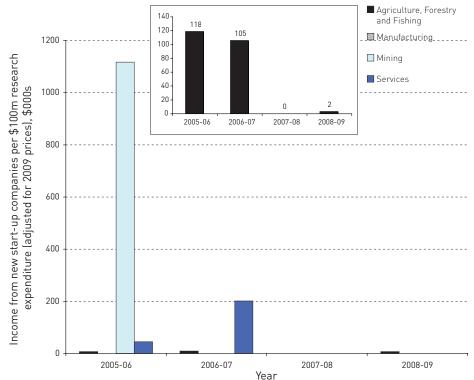


Figure 27: Income from new start-up companies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Income from new start-up companies per \$100m research expenditure for all CRCs over the same period.



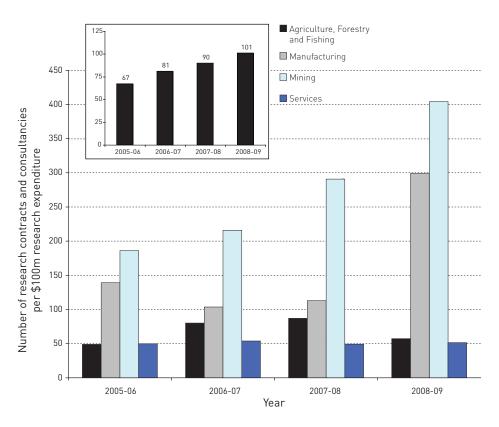
RESEARCH CONTRACTS AND CONSULTANCY ACTIVITY

KEY POINTS

DATA FOR 2008-09

- Between 2005-06 and 2008-09, CRCs entered into 2,285 research contracts and consultancies with a total value of \$199m (see Table 24). Greatest research contract income came from the *Agriculture, forestry and fishing* industry (\$66m) and the *Services* sector (\$61m) during this period. In contrast, the *Manufacturing* industry's income was 8% of the total at \$16m.
- The number of research contracts and consultancies per \$100m research expenditure increased by 25% from 81 in 2006-07, to 101 in 2008-09. This increase has been driven by growth in contracts negotiated by the *Manufacturing* and *Mining* industries (see Figure 28).
- The income from research contracts and consultancies per \$100m research expenditure has varied between \$7.8m and \$8.8m between 2005-06 and 2008-09 (see Figure 29).

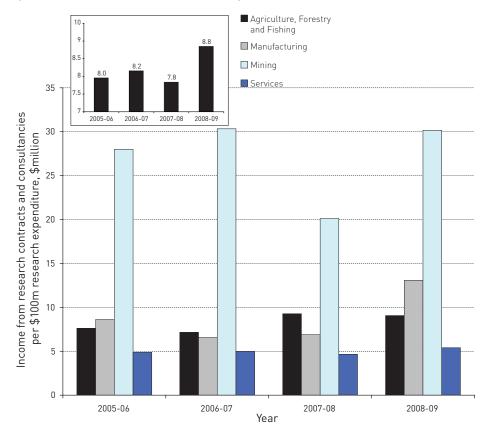
Figure 28: Number of research contracts and consultancies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of research contracts and consultancies per \$100m research expenditure for all CRCs over the same period



	Researc	h contracts and co	nsultancies (No.)		Income from research contracts and consultancies (\$'000)						
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09			
Agriculture, Forestry and Fishing	129	200	188	105	16,670	15,548	18,358	15,197			
Manufacturing	78	52	54	141	4,009	2,865	3,019	5,650			
Mining	124	148	192	158	15,481	18,098	12,169	11,276			
Services	208	203	167	138	16,948	16,335	14,497	13,268			
Total	539	603	601	542	53,108	52,846	48,043	45,391			

Table 24: CRC research contracts and consultancies, 2005-06 to 2008-09

Figure 29: Income from research contracts and consultancies per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Income from research contracts and consultancies per \$100m research expenditure for all CRCs over the same period.



PROFESSIONAL DEVELOPMENT AND OTHER KNOWLEDGE EXCHANGE ACTIVITY

KEY POINTS

DATA FOR 2008-09

- Between 2005-06 and 2008-09, CRCs provided 1,115 training courses and 2,277 conferences to end users of research with a total value of \$5.1m (see Table 25). The high number of training courses offered by the *Agriculture, forestry and fishing* industry in 2005-06 principally stemmed from the *CRC for Viticulture* which conducted 143 extension programs in their final year of reporting.
- Forty percent of training courses and 56% of conferences held between 2005-06 and 2008-09 were initiated by the Agriculture, forestry and fishing industry (see Table 25). The Cotton Catchment Communities CRC was the largest contributor to this result by virtue of the large number of small conferences they conduct in cotton growing areas where they travel to deliver events to stakeholders. Similarly, the CRC for Forestry conducted 91 conferences in 2005-06.
- Between 2005-06 and 2008-09, the CRCs generated 8,294 publications and 3,795 confidential or unpublished reports for end-users (see Table 26).
- Since 2005-06, the number of conferences supported by CRCs per \$100m research expenditure has doubled with many CRCs in the *Agriculture, forestry and fishing* industry initiating smaller conferences in regional and rural areas (see Figure 31).
- The income generated from conferences and courses per \$100m research expenditure declined over the 2005-06 to 2008-09 period from \$259,000 to \$176,000 (see Figure 32).
- The number of publications and confidential or unpublished reports increased per \$100m research expenditure between 2005-06 and 2008-09 by 18% and 89% respectively (see Figure 33 and Figure 34).
- Overall, the number of CRC postgraduates taking up employment in industry per \$100m research expenditure has fallen from 42 in 2005-06 to 37 in 2008-09 (see Figure 35).
- Importantly, 1,179 postgraduates sourced from CRCs were employed in industry between 2005-06 and 2008-09 (see Table 26).

Figure 30: Number of training courses offered to end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of training courses offered to end-users per \$100m research expenditure for all CRCs over the same period.

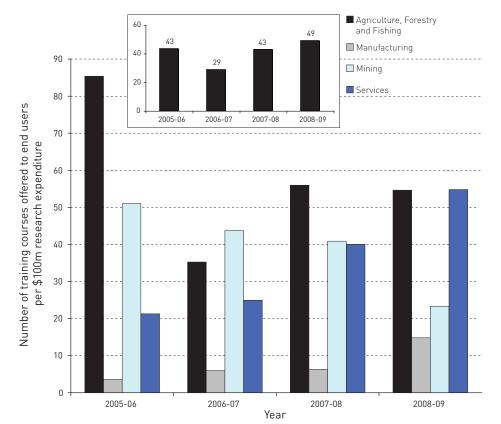
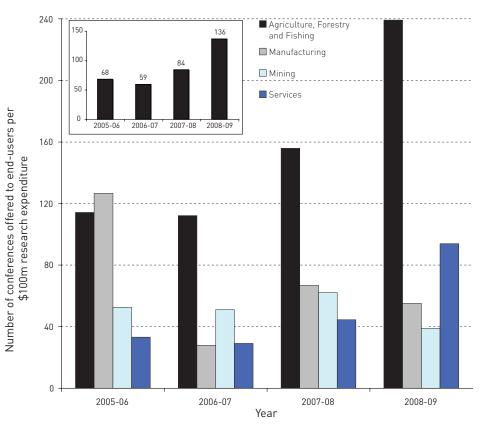


Figure 31: Number of conferences offered to end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of conferences offered to end-users per \$100m research expenditure for all CRCs over the same period.



	Training cou	urses offere	d to end-use	ers (No.)	Conferenc	es provided	to end-user	s (No.)	Income from	courses and	d conference	es (\$'000)
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	225	88	121	100	301	280	337	438	422	246	158	108
Manufacturing	2	3	3	7	71	14	32	26	257	13	183	38
Mining	34	30	27	9	35	35	41	15	163	253	202	222
Services	89	94	136	147	139	110	151	252	890	699	734	535
Total	350	215	287	263	546	439	561	731	1,732	1,211	1,277	903

Table 25: Number of training courses and conferences offered to end-users and income derived from these activities, 2005-06 to 2008-09

Table 26: Publication and reports prepared for end-users and postgraduate employment in industry, 2005-06 to 2008-09

					Confider	itial and unp	ublished re	ports				
	Publicati	ions prepare	ed for end-u	sers (No.)		for end-use	ers (No.)		Postgradua	ates employ	ed with indu	ıstry (No.)
Industry Sector	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09	2005-06	2006-07	2007-08	2008-09
Agriculture, Forestry and Fishing	1,089	600	747	951	137	120	141	179	96	92	114	89
Manufacturing	108	124	187	148	202	307	376	253	41	17	17	5
Mining	188	284	262	185	154	129	110	109	14	34	26	12
Services	1,121	489	1,119	692	355	334	367	522	189	181	158	94
Total	2,506	1,497	2,315	1,976	848	890	994	1,063	340	324	315	200

Figure 32: Income from courses and conferences provided to end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Income from courses and conferences provided to end-users per \$100m research expenditure for all CRCs over the same period.

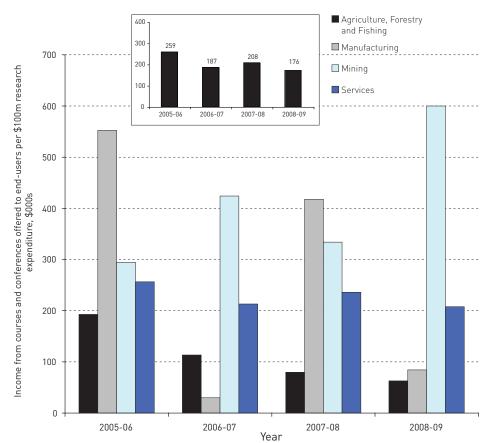


Figure 33: Number of publications for end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of publications for end-users per \$100m research expenditure for all CRCs over the same period.

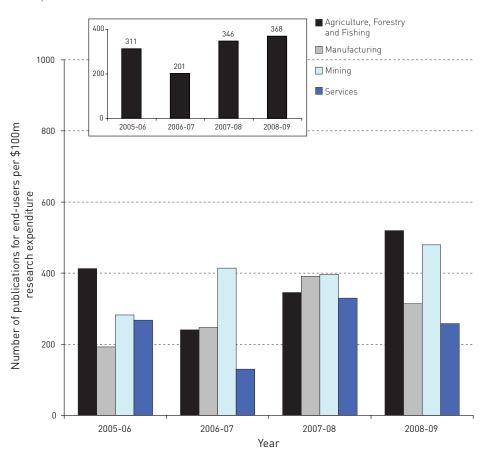


Figure 34: Number of confidential and unpublished reports for end-users per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of confidential and unpublished reports for end-users per \$100m research expenditure for all CRCs over the same period.

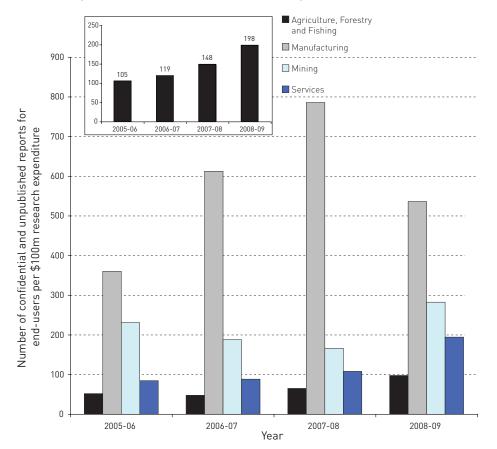
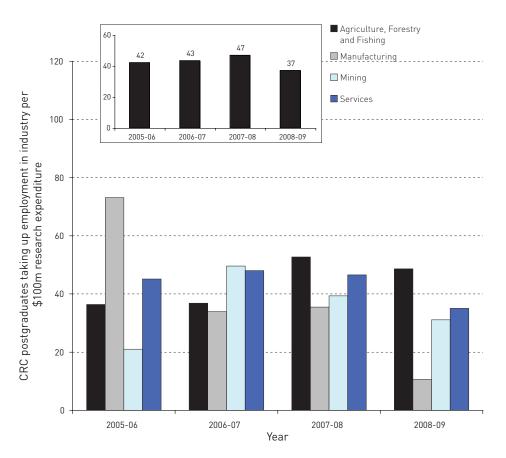


Figure 35: Number of CRC postgraduates to take up employment in industry per \$100m research expenditure for each CRC sector, 2005-06 to 2008-09 Inset figure: Number of CRC postgraduates to take up employment in industry per \$100m research expenditure for all CRCs over the same period.



5. METHODOLOGY

This report involves four different datasets: NSRC data for the years 2008 and 2009 using all respondent data (77); NSRC time series data covering 2000 to 2009 using time series cohort (58); international comparisons data for Canada, US, Europe and the UK covering 2000 to 2009; and data for all Cooperative Research Centres (CRCs) covering 2005-06 to 2008-09.

NSRC DATA FOR 2008 AND 2009

The NSRC for 2008 and 2009 aims to achieve a balance between gathering relevant data, including data that will be useful to institutions, and minimising the reporting burden. A total of 72 institutions responded to some questions for at least one of the two years from 2008 to 2009 (see Appendix 1).

In total, 98 institutions were approached to take part:

- 5 publicly funded research agencies 5 responded (100%);
- 39 universities 37 responded (95%); and
- 54 medical research institutes 30 responded (56%).

The questionnaire consisted of 32 questions covering research expenditure, intellectual property protection activity, start-up company formation, research contracts and consultancies and skills development and transfer. The survey questionnaire and explanatory notes are included at Appendix 2 and 3 respectively. A list of start-up companies reported as being formed in 2008 and 2009 is provided at Appendix 4.

The survey instrument used in 2010 reflected consultations with a stakeholder advisory group which was constituted in late 2009 and operated until May 2010. The removal of several questions (non-time series) from the 2010 survey iteration reflected advice from the stakeholder advisory group, as did the inclusion of new questions in regards to broader categories of commercialisation related employment, material transfer agreements, and the provenance of companies with which institutions have executed LOAs.

Existing metrics were first put forward for consideration and comment – with the proviso that the time series metrics should not be subject to removal. Some 110 potential new metrics were examined from a variety of sources, including the current

version of the AUTM survey, an Intellectual Property Research Insitute of Australia list of potentially useful metrics commissioned for Knowledge Commercialisation Australia (KCA) and those directly suggested by participants. Metrics were rated for their utility and viability of collection. The ultimate selection of metrics reflected the views of the advisory group.

Some existing questions were expanded to obtain greater detail about activity (in particular, LOAs and research contracts and consultancies), but this was undertaken carefully as to preserve the utility of the question from a time series perspective.

The Department surveyed 98 organisations for both years of the survey. Although data presented has not been audited and is largely presented as provided, in several instances, additional and updated data was requested following a check for internal consistency.

The collection vehicle was a "smart" form developed within the department to facilitate consistency of data responses across the questionnaire. In the few instances of inconsistent data provided by institutions, respondents were contacted for an explanation/resolution and all instances of inconsistent data provided were able to be addressed through this process.

The reporting period covers the calendar years 2008 to 2009 or the financial years 2007-08 to 2008-09, depending on the institution's normal reporting period. Where an institution reported on a financial year basis, values were converted into a calendar year by averaging values reported for successive financial years. All dollar values are as reported for the relevant year unless otherwise indicated.

NSRC TIME SERIES 2000 TO 2009

To identify trends and cycles in commercialisation activity it was necessary to construct a consistent dataset covering the years from 2000 to 2009. The following methodology was used to construct the time series.

All dollar values presented are expressed in constant 2009 prices using the chainvolume index applied to the Gross Domestic Product in the Australian System of National Accounts.³⁴

³⁴ Dollar figures adjusted to 2009 dollars for all time-series data using the chain-volume index applied to the Gross Domestic Product in the Australian System of National Accounts. Reference -5206.0 Australian National Accounts: National Income, Expenditure and Product. Table 32. Expenditure on Gross Domestic Product (GDP), Chain volume measures and Current prices, Annual. Gross domestic product:Implicit price deflators.

Only metrics for which the survey questions have remained consistent over the period were included. These 16 metrics, which are listed in Table 27, allow derived metrics to be calculated. For each of these metrics, the unit record files from previous surveys were scrutinised and any inconsistencies or errors corrected where possible following discussions with the relevant institution.

Table 27: List of metrics covered in the NSRC consistent time series dataset for 2000-09

Commercialisation staff (FTE)
Invention disclosures
New US patent and plant breeder rights applications
New Australian patent and plant breeder rights applications
New Patent Cooperation Treaty patent and plant breeder rights applications
Australian patent and plant breeder rights issues
US patent and plant breeder rights issues
Patents and plant breeder rights issued worldwide
LOAs executed
Number of LOAs yielding income
LOA gross income in constant 2009 prices (\$million)
LOAs income paid to others in constant 2009 prices (\$million)
Start-up companies formed during the year
Start-up companies operational at year end dependent on assignment of technology
Start-up companies operational at year end with institutional equity stakes
Value of equity holdings in constant 2009 prices (\$million)

Any institution with a response rate of greater than or equal to 70% for these metrics was included in the consistent time series dataset for 2000 to 2009. Data coverage was calculated by counting for each institution the number of years for which a usable response had been provided. Blank, unknown and N/A (not applicable) responses were not incorporated. The response count for each institution was then expressed as a percentage of the maximum possible count of 160 (that is, ten years of usable data multiplied by 16 metrics). For example, if an institution did not respond for the year 2000, but responded in the years 2001-09 to a sufficient number of questions to make the 2000-09 overall response rate greater than 70%, then the institution was included in the time series.

An institution-by-institution map of data coverage can be found in Table 28. This table details the number of years for which usable data are available for each metric and on that basis calculates the percentage data coverage for each institution. The first column in the table lists the 58 institutions that are covered in the consistent time series cohort. While 58 institutions were also included in the time series cohort for the 2005-07 iteration of the survey, that cohort and the current one are not identical, differing by two institutions.

Similar to the findings of the last NSRC report, the 58 institutions included in this report's time series cohort account for over 90% of all the commercialisation activity reported by all institutions between 2008 and 2009.

Table 29 details the movement of each of these 16 metrics on a year by year basis. Table 30 contains measurements of the difference between the full sample and the sample provided by the consistent time series dataset for 2000 to 2009. The average percentage coverage of the consistent time series dataset and the full dataset for all 16 metrics is 91.3%.

Detailed tables can be found on the Department of Innovation, Industry, Science and Research (DIISR) website.³⁵ In these metric-specific, electronic tables all financial values are in their 'as reported' form and have not been converted to constant prices. This is to allow easy comparisons with previously published data. N/A is used to indicate that a data point is not available for a particular year (due to nonparticipation in the survey, an N/A, blank or unknown response). Each table allows the difference between the full dataset and the consistent time series dataset to be judged. The final column specifies whether or not a particular institution is included in the consistent time series dataset.

All reported time series financial data in this Report have been adjusted using the 2009 chain volume measure. Tables reporting on financial data collected during the current survey are as reported (in nominal terms) – with the exception of the Summary Table (see Table 1), where financial data is expressed in 2009 constant prices.

35 http://www.innovation.gov.au/Innovation/ReportsandStudies/Pages/NationalSurveyofResearchCommercialisation.aspx

Table 28: Details of the data coverage for 16 key commercialisation metrics, 2000-09

	Included in the consistent time series dataset	Percentage coverage of metrics and years [%]	Key data coverage count (metrics and years)	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	LOAs and income totals	How much of the LOA and other income was paid to other institutions	Start-up companies formed	Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
ANZAC Research Institute	Ν	43%	69	5	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4
Austin Research Institute	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Australian Catholic University	Y	75%	120	8	8	8	8	8	8	8	8	8	6	6	6	6	8	8	8
Australian Institute of Marine Studies	Y	79%	126	9	9	9	9	9	6	6	6	9	7	7	7	8	9	9	7
Australian Neuromuscular Research Institute	Ν	10%	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Australian Nuclear Science and Technology Organisation (ANSTO)	Y	85%	136	9	9	9	9	9	9	9	9	9	9	7	7	7	9	7	9
Baker IDI Heart and Diabetes Institute	Y	88%	141	9	9	9	9	9	9	9	9	9	9	9	8	7	9	9	9
Bernard O'Brien Institute of Microsurgery	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bionic Ear Institute	Ν	49%	78	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5
Bond University	Ν	64%	103	7	7	7	7	7	7	7	7	7	5	5	5	5	7	6	7
Burnet Institute	Y	98%	156	10	10	10	10	10	10	10	10	9	10	10	10	9	10	10	8
Cancer Council Victoria	N	69%	110	7	7	7	7	7	7	7	7	7	7	7	7	5	7	7	7
Centenary Institute of Cancer Medicine and Cell Biology	Y	89%	143	10	9	8	9	8	7	8	8	10	10	10	10	8	10	10	8
Central Queensland University	Y	70%	112	8	6	8	8	6	7	7	8	8	6	6	6	6	8	8	6
Centre for Eye Research Australia	Ν	49%	78	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5
Charles Darwin University	Y	80%	128	9	9	9	9	9	9	9	9	9	7	5	7	7	6	6	9
Charles Sturt University	Y	78%	124	8	8	8	8	8	8	8	8	8	8	8	8	6	7	7	8
Children's Cancer Institute Australia for Medical Research	Ν	30%	48	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

	Included in the consistent time series dataset	Percentage coverage of metrics and years (%)	Key data coverage count (metrics and years)	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	LOAs and income totals	How much of the LOA and other income was paid to other institutions		Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
Children's Medical Research Institute	Ν	28%	45	4	4	3	3	1	2	2	2	4	2	2	2	2	4	4	4
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Y	97%	155	10	9	10	10	8	10	10	10	10	10	10	10	10	9	9	10
Curtin University of Technology	N	69%	111	7	7	7	7	6	7	7	7	7	7	7	7	7	7	7	7
Deakin University	Y	91%	146	10	8	10	10	10	10	10	10	10	8	8	8	9	8	7	10
Defence Science & Technology Organisation (DSTO)	Y	88%	140	9	9	9	9	7	9	9	9	9	9	9	9	7	9	9	9
Ear Science Institute Australia	N	10%	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Edith Cowan University	Y	96%	154	7	10	9	10	10	10	10	10	10	10	10	10	8	10	10	10
Flinders University	Y	99%	158	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	10
Florey Neuroscience Institutes	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fremantle Heart Institute	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Garvan Institute for Medical Research	Ν	64%	102	7	7	5	7	5	7	5	7	7	7	5	5	7	7	7	7
Genomic Disorders Research Centre	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Griffith University	Y	93%	148	10	10	8	10	9	7	7	10	9	10	10	10	8	10	10	10
Hanson Institute	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heart Research Centre	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hunter Medical Research Institute	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Institute for Breathing and Sleep	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Institute for Eye Research	Ν	39%	62	5	5	5	5	5	5	5	5	5	3	3	3	2	2	2	2
Institute of Dental Research	N	36%	58	4	4	4	4	4	4	4	4	4	2	2	2	4	4	4	4
Institute of Respiratory Medicine	Ν	10%	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

	Included in the consistent time series dataset	Percentage coverage of metrics and years (%)	Key data coverage count {metrics and years}	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	LOAs and income totals	How much of the LOA and other income was paid to other institutions	Start-up companies formed	Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
James Cook University	Y	92%	147	10	10	8	9	9	7	8	10	8	10	10	10	8	10	10	10
Keogh Institute for Medical Research	Ν	30%	48	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Kolling Institute of Medical Research	Ν	15%	24	2	2	2	2	2	2	2	2	2	0	0	0	2	2	2	0
La Trobe University	Y	85%	136	10	10	7	7	8	7	7	10	7	6	9	9	9	10	10	10
Lions Eye Institute	Ν	55%	88	7	7	7	7	7	7	7	7	5	5	5	5	5	2	0	5
Ludwig Institute for Cancer Research	Y	89%	143	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	9
Lung Institute of Western Australia (Inc)	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macquarie University	Y	84%	135	9	9	9	9	9	9	8	9	9	7	7	7	9	9	9	7
Melbourne Health	Ν	21%	33	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mental Health Research Institute of Victoria	Y	89%	142	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	9
Menzies Research Institute	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Menzies School of Health Research	Ν	46%	74	5	5	5	5	5	5	5	5	5	3	3	3	5	5	5	5
Monash University	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Murdoch Childrens Research Institute	Y	98%	157	10	10	9	10	10	10	10	10	10	10	10	10	8	10	10	10
Murdoch University	Y	89%	142	10	8	9	9	9	9	9	9	9	8	8	9	9	10	10	7
National Ageing Research Institute	Ν	16%	26	2	2	2	2	2	2	2	2	2	0	0	0	2	2	2	2
National Heart Foundation of Australia	Ν	50%	80	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
National Vision Research Institute of Australia	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Neuroscience Research Australia	Y	90%	144	10	10	10	10	10	10	10	10	10	6	8	6	8	9	9	8
NICTA	Ν	14%	23	2	2	1	1	1	2	2	2	2	0	0	0	2	2	2	2
Northern Territory University	Ν	9%	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

	Included in the consistent time series dataset	Percentage coverage of metrics and years (%)	Key data coverage count (metrics and years)	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	LOAs and income totals	How much of the LOA and other income was paid to other institutions	Start-up companies formed	Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
Peter MacCallum Cancer Centre	Y	80%	128	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Prince Henry's Institute of Medical Research	Y	86%	138	9	9	9	9	7	9	9	9	9	9	9	9	8	9	7	8
Queensland Cancer Fund	N	19%	31	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
Queensland Institute of Medical Research	Y	84%	135	9	9	6	6	9	9	9	9	9	9	9	9	8	9	9	7
Queensland University of Technology	Y	99%	159	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	10
RMIT University	Y	96%	154	10	10	10	10	10	10	10	10	10	10	10	10	8	8	10	8
Royal Brisbane and Women's Hospital Research Foundation	Y	85%	136	9	9	9	9	9	9	9	9	9	7	7	7	7	9	9	9
Royal North Shore Hospital	Ν	30%	48	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Schizophrenia Research Institute	Ν	66%	105	7	7	7	7	7	7	7	7	6	5	5	5	7	7	7	7
Southern Cross University	Y	95%	152	10	10	10	10	10	10	10	10	10	8	8	8	8	10	10	10
St Vincent's Institute of Medical Research	Ν	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Swinburne University of Technology	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Telethon Institute for Child Health Research	Y	91%	146	10	10	7	10	10	8	8	8	10	10	8	8	9	10	10	10
The Australian National University	Y	97%	155	10	10	10	10	10	9	10	10	10	10	10	10	10	10	10	6
The Cancer Council NSW	Ν	50%	80	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
The George Institute for International Health	Ν	16%	25	2	2	2	2	2	2	2	2	2	2	1	2	0	0	0	2
The Heart Research Institute	Y	71%	114	9	9	6	6	6	6	6	7	9	4	7	7	7	9	7	9
The Kerry Packer Institute of Child Health Research	N	9%	15	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
The Mater Medical Research Institute		00/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
The University of Adelaide	N	0%	0	0	0	0								-		0	0	0	0
	N Y	99%	159	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	10

	Included in the consistent time series dataset	Percentage coverage of metrics and years (%)	Key data coverage count (metrics and years)	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	and ii	How much of the LOA and other income was paid to other institutions	Start-up companies formed	Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
The University of New England	Y	90%	144	10	10	8	9	8	8	8	8	10	10	10	10	9	8	8	10
The University of New South Wales	Y	79%	127	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	8
The University of Newcastle	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
The University of Notre Dame Australia	Y	95%	152	10	10	10	10	10	10	10	10	10	8	8	8	8	10	10	10
The University of Queensland	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
The University of Sydney	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
The University of Western Australia	Y	99%	159	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	10
The Walter and Eliza Hall Institute of Medical Research	Y	99%	158	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	10
The Wesley Research Institute	Ν	46%	74	5	5	5	5	5	5	5	5	5	3	3	3	5	5	5	5
Turning Point Alcohol and Drug Centre	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
University of Ballarat	Y	79%	126	8	8	8	8	8	8	8	8	8	8	8	8	6	8	8	8
University of Canberra	Y	85%	136	9	9	9	9	9	9	9	9	9	7	7	7	7	9	9	9
University of South Australia	Y	100%	160	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
University of Southern Queensland	Y	85%	136	9	7	9	9	9	9	9	9	9	9	7	7	7	9	9	9
University of Tasmania	Y	96%	153	10	10	10	10	9	10	9	10	10	10	10	8	8	10	9	10
University of Technology, Sydney	Y	96%	154	10	10	10	10	10	9	9	9	10	10	10	9	8	10	10	10
University of the Sunshine Coast	Y	85%	136	9	9	9	9	9	9	9	9	9	7	7	7	7	9	9	9
University of Western Sydney	Y	81%	129	9	8	8	8	6	8	8	9	8	8	9	7	8	9	9	7
University of Wollongong	Y	92%	147	10	10	8	8	9	8	8	10	10	10	10	10	8	9	9	10
Victor Chang Cardiac Research Institute	Y	98%	157	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	9
Victoria University	Y	92%	147	10	9	7	9	9	7	9	10	10	10	10	10	7	10	10	10

	Included in the consistent time series dataset	Percentage coverage of metrics and years (%)	Key data coverage count (metrics and years)	Commercialisation Staff FTEs	Invention Disclosures	New US patent and plant breeder rights applications	New Australian patent and plant breeder rights applications	New PCT patent and plant breeder rights applications	Australian patent and plant breeder rights issues	USA patent and plant breeder rights Issues	Worldwide patent and plant breeder rights issues	LOAs executed	Active LOAs yielding income	LOAs and income totals	How much of the LOA and other income was paid to other institutions	Start-up companies formed	Start-up companies operational dependent upon LOAs for initiation	Operational start-up companies in which they hold equity	Value of all equity holdings
Victorian Breast Cancer Research Consortium	Ν	20%	32	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Western Australian Institute for Medical Research	N	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westmead Millennium Institute	N	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Women's and Children's Health Research Institute	Y	89%	142	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	9
Woolcock Institute of Medical Research	Ν	47%	75	5	5	5	5	5	5	5	5	5	5	5	5	0	5	5	5

Note: "Nil" respondents (institutions responding, but not signifying any outcomes) to this iteration of the survey, which did not participate in previous iterations of the survey have not been included in this table.

Table 29: Total metric values in the consistent time series dataset 2000–09³⁶

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dedicated commercialisation staff	FTE	191	231	281	296	282	295	299	289	309	309
Invention disclosures	No.	544	716	707	810	956	926	1,081	1,196	1,300	1,409
New US patent and plant breeder rights applications	No.	177	125	108	80	118	104	97	112	148	148
New Australian patent and plant breeder rights applications	No.	410	345	395	459	469	414	449	415	502	494
New Patent Cooperation Treaty patent and plant breeder rights applications	No.	206	217	218	162	167	193	190	212	174	157
Australian patent and plant breeder rights issues	No.	143	82	106	142	173	91	103	84	157	138
US patent and plant breeder rights issues	No.	115	64	54	126	191	92	105	79	67	83
Patents and plant breeder rights issued worldwide	No.	524	273	315	805	814	540	582	508	844	841
LOAs executed	No.	414	383	445	433	381	453	515	549	472	491
LOAs yielding income	No.	489	605	629	629	666	656	708	746	629	691
LOA gross income in constant 2009 prices ³⁷	\$m	142.831	100.894	101.442	97.928	83.041	81.886	136.279	240.948	99.705	303.097
LOA income paid to others in constant 2009 prices ³⁷	\$m	5.964	7.745	9.511	14.134	9.046	7.934	9.846	7.678	5.911	3.993
Start-up companies formed during the year	No.	47	61	58	50	29	38	41	33	14	19
Start-up companies operational at year end dependent on assignment of technology	No.	86	109	119	228	251	220	237	242	196	195
Start-up companies operational at year end with institutional equity stakes	No.	69	79	96	182	203	169	192	200	176	175
Value of equity holdings in constant 2009 prices ³⁷	\$m	168.363	169.952	145.196	196.125	230.353	183.282	202.351	202.992	177.162	221.856

³⁶ As described in the Methodology (NSRC time series 2000 to 2009), in order to maintain a time series set of data, an institution is included if it provided > 70% data coverage. The 2003 and 2004 NSRC time series consisted of 59 institutions, 2005-07, 58 institutions. The current report has one additional institution included, whilst three institutions have not been considered by virtue of the "70% rule". This necessarily means that Table 28 has some minor data changes from those published in the 2003 and 2004 and the 2005-07 NSRC Reports.

³⁷ As all financial data has been updated to reflect 2009 dollars, figures have changed from those published in the 2005-07 NSRC Report.

Table 30: Differences between totals in the full sample and the consistent time series dataset in 2009

	Unit	Consistent time series sample total as a percentage of overall sample total in 2009	Value of difference between full sample and consistent dataset sample in 2009
Dedicated commercialisation staff	FTE	93.2%	23
Invention disclosures	No.	94.1%	89
New US patent applications	No.	82.6%	31
New Australian patent applications	No.	87.0%	74
New Patent Cooperation Treaty patent applications	No.	86.3%	25
Australian patent issues	No.	90.8%	14
US patent issues	No.	95.4%	4
Patents issued worldwide	No.	97.0%	26
LOAs executed	No.	96.7%	17
Number of LOAs yielding income	No.	98.2%	13
LOA gross income	\$	95.1%	15,740,468
LOA income paid to others	\$	100.0%	0
Number of start-ups formed during the year	No.	70.4%	8
Number of start-ups operational at year end	No.	90.3%	21
Number of start-ups operational at year end with institutional equity stakes	No.	89.3%	21
Value of equity holdings	\$	94.7%	12,357,444

INTERNATIONAL COMPARISONS

The report compares the commercialisation activity of Australian, United States, Canadian, European and United Kingdom research institutions against a small number of indicators over the period 2000 to 2009. Comparative data is drawn from:

- The National Surveys of Research Commercialisation (NSRC) in Australia covering the years 2000 to 2009 – covering publicly funded research institutions, universities and medical research institutes.³⁸
- The US Association of University Technology Managers (AUTM) Licensing Survey for the financial years 2008 and 2009.
- The Canadian AUTM Licensing Survey for 2008 and 2009.

- The UK University Commercialisation Survey undertaken by the University Companies Association (UNICO).³⁹
- The *Higher Education Business and Community Interaction Surveys* (HE-BCIS) (2000 to 2009), Higher Education Funding Council for England (HEFCE).
- Summary Respondent:ASTP Survey for Fiscal Year 2008, UNU-MERIT and Association of European Science and Technology Professionals, Maastricht, Netherlands.²⁷

³⁸ The data reported each year was used rather than time series data presented elsewhere in this report

³⁹ The University Companies Association, UNICO. 2003. UNICO Survey of University Commercialisation. London.

The comparisons have been prepared within the following parameters:

- Not all questions asked in the surveys in each country are directly comparable. For example, it was necessary to source the dedicated commercialisation staff metric from the UNICO data, rather than the HE-BCIS survey, since only the UNICO definition of commercialisation staff matched the NSRC and AUTM surveys. UNICO data is only available to 2005.
- The data has been adjusted to calendar years to increase the ease of comparison.
- For each country, research expenditure and LOA income received were reported in local currency. This value was converted to US dollars by dividing that expenditure by the purchasing power parities developed by the Organisation for Economic Cooperation and Development (OECD) for each year respectively. This was not necessary for "Average number of licensing FTE per institution" metric or "LOA income as a % of research expenditure" metric.
- The Australian research expenditure used was that reported in the current and past NSRC surveys, with institutions that had no commercialisation activity excluded from the analysis.
- Australian totals for 2000 to 2009, exclude data for CRCs. However, if any institution inadvertently included CRC data in their response that data was included.

RESEARCH EXPENDITURE

Research expenditures for the majority of Australian respondents are only calculated for every second year (in response to a biennial ABS survey). This corresponds to the years 2000, 2002, 2004, 2006 and 2008. Following the method adopted in the NSRC 2002 report, the 2001, 2003, 2005 and 2007 research expenditure data are taken to be the average of the preceding and following years. For 2009 institutions were asked to nominate an estimated value.

COOPERATIVE RESEARCH CENTRES (CRCs)

For 2001 and 2002, CRCs were included as respondents to the NSRC. For the 2003 survey and onwards, it was decided that CRC commercialisation information would be obtained through CRC annual reporting and the CRC Management Data Questionnaire (MDQ). The questionnaire is a monitoring and evaluation instrument used by DIISR specifically for the CRC Program.

The MDQ is not fully consistent with all of the metrics used in the NSRC, but there is sufficient commonality for reporting data in relation to a number of metrics. To reduce the risk of double counting or under-reporting against a number of the metrics, CRC data were not aggregated with NSRC data.

In order to present consistent time series trends in commercialisation activity, the CRC MDQ data has been presented from financial years 2005-06 to 2008-09. CRC time series data was prepared by expressing figures as a proportion of research expenditure to account for the changing number of CRCs between years. Although many metrics are reported back to 1992, research expenditures are only reported back to 2005-06. For this reason the time series was prepared for 2005-06 to 2008-09. As for the NSRC time series data, all dollar values presented are expressed in constant 2009 prices using the chain-volume measure applied to the Gross Domestic Product in the Australian System of National Accounts.

It should be noted that research expenditures reported by the CRCs may be an underestimate of actual expenditure since the education component includes the cost of postgraduate students who undertake significant amounts of research.

The MDQ information is provided by CRCs and has not been verified or independently assessed by DIISR.⁴⁰ As the MDQ data is annually reported, previous years data can be revised. As such the MDQ data presented in this report may not match the data presented in previous NSRC reports, where inaccurate MDQ information has been identifed and corrected.

Over the period of the latest survey, CRCs operated in four broad sectors: Agriculture, Forestry and Fishing; Manufacturing; Mining; and Services.³¹ These sectors represent a contraction of the previous six classifications used by the program. As a result, the datasets for this survey aren't comparable to those presented previously.

⁴⁰ DIISR makes no representation as to the accuracy of this information. Persons or organisations should not rely upon this information without first seeking to verify the accuracy of the information.

APPENDIX 1. SURVEY RESPONDENTS 2008 AND 2009	UTS 2008 AND 20	600
	Responded for 2008? Responded for 2009?	ır 2009?
ruututy ruuteen research agentres Australian Institute of Marine Science	>	>
Australian Nuclear Science and Technology Organisation	X	Y
Commonwealth Scientific and Industrial Research Organisation	λ	7
Defence Science & Technology Organisation	Y	Y
NICTA	Y	7
Universities		
The University of Adelaide	~	≻
Australian Catholic University	Y	Y
The Australian National University	7	~
Bond University	×	7
Central Queensland University	~	≻
Charles Darwin University	γ	X
Charles Sturt University	Z	Z
Curtin University of Technology	¥	×
Deakin University	~	≻
Edith Cowan University	¥	Y
Flinders University	Y	Y
Griffith University	~	~
James Cook University	~	~
La Trobe University	~	~
Macquarie University	Y	Y
The University of Melbourne	*	≻
Monash University	Y	Y
Murdoch University	~	~
The University of Newcastle	~	>
Queensland University of Technology	*	7
RMIT University	*	>
Southern Cross University	X	×
Swinburne University of Technology	*	>
The University of New England	*	7
University of Ballarat	Z	Z
University of Canberra	¥	X
The University of New South Wales	Y	Y
University of Notre Dame Australia	Y	Y
The University of Queensland	Y	Y
University of South Australia	~	×
University of Southern Queensland	~	≻
The University of Sydney	*	×
University of Tasmania	7	>
University of Technology Sydney	×	×
University of the Sunshine Coast	~	≻
The University of Western Australia	Y	Y
University of Western Sydney	Y	Y
Victoria University	~	≻
University of Wollongong	×	×

NATIONAL SURVEY OF RESEARCH COMMERCIALISATION 2008 AND 2009

64

Institution	
Medical Research Institutes	
ANZAC Research Institute	λ
Baker IDI Heart and Diabetes Institute	Y
Bionic Ear Institute	Z
Burnet Institute	Υ Υ
Cancer Council of NSW	Z
Cancer Council Victoria	Y
Centenary Institute of Cancer Medicine and Cell Biology	Y
Children's Medical Research Institute	Y
Garvan Institute of Medical Research	۲ ۲
Howard Florey Institute of Physiology and Medicine	Y
Institute for Breathing and Sleeping	Y
Institute of Dental Research	Υ Υ
Institute for Eye Research	Y
Kolling Institute of Medical Research	Y
Lions Eye Institute	Y
Ludwig Institute for Cancer Research	Y
Mental Health Research Institute of Victoria	Y
Menzies School of Health Research	Y
Murdoch Children's Research Institute	Y
National Ageing Research Institute	Y
National Stroke Research Institute	Z
Neuroscience Research Australia	Y
Peter MacCallum Cancer Centre	Y
Prince Henry's Institute of Medical Research	Y
Prince of Wales Medical Research Institute	N
Queensland Cancer Fund	N
Queensland Institute of Medical Research	Y
Royal Brisbane & Women's Hospital Foundation	Y
Schizophrenia Research Institute	Y
Telethon Institute for Child Health Research	Y
The Heart Research Institute	Y
The Walter and Eliza Hall Institute of Medical Research	Y
The Wesley Research Institute	Y
Victor Chang Cardiac Research Institute	Y
Women's and Children's Health Research Institute	Y
Woolcock Institute of Medical Research	Z

respondents, that is, they provided data for survey years, but all the supplied values were "0". Note: A number of the respondents were "nil response"

APPENDIX 2. SURVEY QUESTIONNAIRE 2008 AND 2009

DIISR NATIONAL SURVEY OF RESEARCH COMMERCIALISATION – 2008-2009

Please ensure that you have read the Survey Instructions and Explanatory Notes Part 1 and 2 before preparing your responses to this survey. Please note that this is a reference only version of the survey and that the survey should be completed electronically in the provided response template.

PART 1: PRELIMINARIES

1a. Name of institution: _

1b. ABN/s or CAN/s of institution.

1c. Postcode

1		1

Research Expenditure

2a. Have you completed the most recent Australian Bureau of Statistics (ABS) Survey (ie, 31 December 2008 or 30 June 2009)*?

Yes/No

If Yes, what was your institution's research and experimental development expenditure as reported in the most recent Australian Bureau of Statistics (ABS) survey (ie: 31 December 2008 or 30 June 2009)?

2008 Number	

2009 Number

2b. Please indicate the end date for the relevant ABS survey reporting period*:

□ 31 December 2008 □ 30 June 2009 □ 31 December 2009 □ 30 June 2010

* Note that this reporting period is not identical to the reference period for this survey (2008-2009).

PART 2: INTELLECTUAL PROPERTY

This Part is structured to broadly follow the IP commercialisation process, i.e. from resourcing, through invention disclosure, to licensing and spin-out formation. Please see the Explanatory Notes for guidance on activities that are to be included.

Resourcing

3. In reporting period, how many Full Time Equivalents (FTE) were employed in, or engaged by, your institution, and what were their associated costs, for the purposes of driving or supporting commercialisation in the following areas?

		FTE Number	Staff / Budget Cost
a.	Dedicated legal staff		\$
b.	Dedicated marketing staff		\$
С	Dedicated commercialisation staff		\$
d	Industry Community Engagement Staff		\$
e.	Other commercialisation support staff		\$
f.	Total		\$

4. In the reporting period what was your institution's Technology Transfer Office (TTO) or external commercialisation related costs, excluding employment and legal costs?

		2008 Cost	2009 Cost
a.	Marketing	\$	\$
b.	Other	\$	\$
С.	Total	\$	\$

5. What did your institution spend to secure or defend statutory protection of intellectual property rights (e.g. patents, plant breeder rights, copyright, trade marks and/or registered designs) in 2008/2009?

	2008 Cost	2009 Cost
External fees and legal costs	\$	\$

6. What amount was received by your institution <u>from licensees</u> as reimbursements of expenses reported in Question 5 (External fees and legal costs)?

2008 Number	2009 Number
\$	\$

7. How many invention disclosures did your institution receive in 2008/2009?

2008 Number	2009 Number

Patent and Plant Breeder Rights Application

8. How many patent and/or plant breeder rights applications were filed in 2008/2009?

		2008 Total Applications	2008 New Applications	2009 Total Applications	
a.	In Australia				
b.	In the United States				
С.	Elsewhere				
d.	Total				

9. How many <u>new</u> applications filed in 2008/2009 were for each of the following:

		2008 Number	2009 Number
a.	Provisional patents		
b.	Patent Cooperation Treaty (PCT) patents		
С.	Innovation patents		
d.	National Phase		
e.	Divisionals		
f.	Plant Breeder Rights		
	Sub Total:		
g.	Registered Designs		
h.	Trademarks		
i.	Other		
j.	Total		

10. How many separate patent and/or plant breeder rights families are represented in the <u>total</u> patent and/or plant breeder rights applications specified as having been filed in 2008/2009 (as reported in question 8)?

2008 Number	2009 Number

Patents and Plant Breeder Rights Issued (Including Renewals)

11. How many patents and/or plant breeder rights were issued to your institution in 2008/2009?

		2008 Number	2009 Number
a.	In Australia		
b.	In the United States		
C.	Elsewhere		
d.	Total		

12. How many patent and/or plant breeder rights families are represented in the patents and/or plant breeder rights issued to your institution in 2008/2009 (as reported in question 11)?

2008 Number	2009 Number

Patent and Plant Breeder Rights Holdings

13. How many patents and/or plant breeder rights did your institution hold as of 31 December 2008/2009?

		2008 Number	2009 Number
a.	Patents and or plant breeder rights pending		
b.	Patents and or plant breeder rights issued		
С.	Total		

14. How many patent and/or plant breeder right families did your institution hold as of 31 December 2008/2009?

2008 Number	2009 Number

15. How many patents and/or plant breeder rights were culled or allowed to lapse from your institution's holdings in 2008/2009?

2008 Number	2009 Number

Licences/Options/Assignments

This section refers to Licences/Options/Assignments (LOA) negotiated on full commercial terms only.

16. a. How many Material Transfer Agreements (MTAs) did your institution enter into during 2008/2009 where your institution provided the materials?

2008 Number	2009 Number

b. What income did you derive from the agreements executed?

2008 Number	2009 Number
\$	\$

17. How many Licences/Options/Assignments (LOAs) did your institution:

a. Execute?

		2008 Number	2009 Number
i.	Licences		
ii.	Options		
iii.	Assignments		
iv.	Total		

The 'active' portion of this question will initially be pre-populated with values from the 'execute' section as minimum values. These values can be edited to a greater or equal number.

b. Have active*?

		2008 Number	2009 Number
i.	Licences		
ii.	Options		
iii.	Assignments		
iv.	Total		

18. During 2008/2009 what was the location/ownership profile of the organisations with which LOAs were executed:

		2008 Number	2009 Number
a.	Australian owned and based companies / organisations		
b.	Australian owned and foreign based companies / organisations		
C.	Foreign owned and Australian based companies / organisations		
d.	Foreign owned and foreign based companies / organisations		
e.	Unknown		
f.	Total		

19. How many active LOAs yielded income in 2008/2009?

*(if Q19 is not answered or equal to zero, proceed to Question 23)

2008 Number	2009 Number

*These 2008/2009 values cannot exceed the TOTAL ACTIVE Licence and Options specified in Question 17.

20. For those active LOAs that yielded income in 2008/2009 (question 19), how many LOA incomes can be attributed to the following income categories? What is the value of income derived from each income category?

		2008 Number	2008 Income	2009 Number	2009 Income
а.	Running royalties		\$		\$
b.	Cashed-in equity		\$		\$
C.	Other		\$		\$
d.	Total*		\$		\$

*TOTAL for the 2008/2009 number cannot exceed the value specifed in Question 19 2008/2009

21. For those active LOAs that yielded income in 2008/2009 (as stated in question 19), how many LOA incomes can be placed into each of the following income ranges?

		2008 Number	2009 Number
а.	Between \$0 and \$10,000		
b.	Between \$10,001 and \$50,000		
C.	Between \$50,001 and \$200,000		
d.	Between \$200,001 and \$500,000		
e.	\$500,001 and over		
f.	Total*		

*TOTAL for the 2008/2009 number cannot exceed the value specifed in Question 20 2008/2009

22. In 2008/2009, how much of the income reported in the "Total Income" of Question 20 was paid to other institutions or commercial entities?

2008 Number	2009 Number
\$	\$

Capital Raising, Initial Public Offerings and Equity

23. Did your institution participate in any capital raising for research commercialisation activities, including Initial Public Offerings (IPO), in 2008/2009?

		2008 Number	2008 Final Capital Raised	2009 Number	2009 Final Capital Raised
a.	IPOs		\$		\$
b.	Other capital raising activities		\$		\$
с.	Total final capital raised		\$		\$

24. What was the value of all research commercialisation equity holdings as of 31 December 2008/2009?

2008 Number	2009 Number
\$	\$

25a. How many research commercialisation equity holding positions were fully or partially exited (i.e. by trade sale or buy-out) during 2008/2009?

2008 Number	2009 Number	

25b. What was the total value of equity received from all research commercialisation equity holdings that were fully or partially exited during 2008/2009?

2008 Number	2009 Number
\$	\$

Start-up Companies

26. For all start-up companies your institution was formally involved in and were <u>operational</u> as of 31 December 2008/2009:

		2008 Number	2009 Number
a.	How many were dependent upon the licensing/assignment of your institution's technology for initiation?		
b.	In how many of the companies identified in question 26, above, did your institution hold equity?		

27. What was the number of start-up companies dependent upon the licensing of your institution's technologies that ceased operations in 2008/2009?

2008 Number	2009 Number

Names and Contact Details of New Start-Up Companies

28. How many start-up companies did your institution launch in 2008/2009

2008 Number	2009 Number

Please provide details for each of the start-up companies that were formed in «Survey_Year», to allow for survey follow-up if required. (Please complete a subform for each company nominated.)

Name of company:	
Address:	
Suburb:	
State:	
Postcode:	
Country:	
Telephone:	
Email:	
ABN:	
ACN:	

What was the start-up company's funding source(s)?

		Approximate Dollar Amount
a.	Internal funding	\$
b.	Your institution	\$
C.	Venture capital	\$
d.	Corporate partner(s)	\$
e.	IPO	\$
f.	Government funding	\$
g.	Individual angel(s)	\$
h.	Friends and family	\$
i.	Debt	\$
j.	Other	\$

PART 3: RESEARCH CONTRACTS, CONSULTANCIES AND DIRECT SALES

Please see the Explanatory Notes for clarification on the activities covered by Research Contracts and Research Consultancies and Direct Sales.

29. For research consultancies and contracts your institution entered into in 2008/2009 please identify the:

	2008 Number	2009 Number
Number of consultancies		
Total gross contracted value of consultancies	\$	\$
Number of contracts		
Total gross contracted value of contracts	\$	\$
Number of direct sale transactions		
Total gross value of direct sales	\$	\$

Note: 'Gross contracted value' refers to the full contracted value of the work, regardless of whether any or all payments were made in the reporting year.

30. Of those research consultancies, contracts and direct sales shown in question 29, please identify:

a. The number of research consultancies according to total gross contracted value.

		2008 Number	2009 Number
i.	Between \$0 and \$10,000		
ii.	Between \$10,001 and \$50,000		
iii.	Between \$50,001 and \$200,000		
iv.	Between \$200,001 and \$500,000		
V.	\$500,001 and over		
vi.	Unspecified		
vii.	Total		

b. The number of research contracts according to total gross contracted value.

		2008 Number	2009 Number
i.	Between \$0 and \$10,000		
ii.	Between \$10,001 and \$50,000		
iii.	Between \$50,001 and \$200,000		
iv.	Between \$200,001 and \$500,000		
V.	\$500,001 and over		
vi.	Unspecified		
vii.	Total		

c. The number of direct sales according to total gross contracted value.

		2008 Number	2009 Number
i.	Between \$0 and \$10,000		
ii.	Between \$10,001 and \$50,000		
iii.	Between \$50,001 and \$200,000		
iv.	Between \$200,001 and \$500,000		
V.	\$500,000 and over		
vi.	Unspecified		
vii.	Total		

PART 4: SKILLS DEVELOPMENT AND TRANSFER

31a. Does your institution offer training and/or presentations / seminars / workshop courses to its researchers and/or research students in commercialisation and entrepreneurship that is undertaken as professional development and is not higher education qualification related:

1 Yes /No [If yes please go to question 31b, if no go to 32]

31b. Does this training include *in-house* training?

Yes /No [If yes please go to question 31b2, if no go to question 32]

31b2: How many participants completed in-house training programs in 2008/2009?

2008 Number	2009 Number

31c. Does this training include delivery by an external provider?

Yes /No [If yes please go to question 31c2, if no go to question 32]

31c2: How many participants completed external training programs in 2008/2009?

2008 Number 2009 Number
32. With reference to the start-up companies in operation as of 31 December 2008/2009 that were dependent upon the licensing/assignment of your institution's technology for initiation (i.e. those identified in response to question 26a):
a. How many research postgraduates were employed in those firms during 2008/2009 (FTE)?

		2008 FTE	2009 FTE
i.	Research postgraduates		
			1

b. How many of your institution's staff were employed in those firms during 2008/2009 (FTE)?

		2008 FTE	2009 FTE
i.	Postdoctoral staff		
ii.	Academic staff		
iii.	Other institution employees		
iv.	Total		

PART 5: ADDITIONAL INFORMATION

33. Is there any other additional information you wish to provide regarding the research commercialisation activities and performance of your institution?

APPENDIX 3. EXPLANATORY NOTES TO THE SURVEY QUESTIONNAIRE 2008 AND 2009

EXPLANATORY NOTES SECTION 1: GENERAL

PURPOSE OF SURVEY

The National Survey of Research Commercialisation (NSRC) seeks to obtain information on the research commercialisation activities and results of Australian universities as well as selected Publicly Funded Research Agencies (PFRA) and Medical Research Institutes (MRI). The information gathered through the NSRC is used to assist government to develop and evaluate policy relating to the innovation system. Additionally, individual institutions and researchers use this information to monitor and compare their own performance and results.

The survey data will be owned by the Commonwealth and published in a written report to be made available on the DIISR website. The report will be due for release in late 2010.

The NSRC has previously been conducted for the years 2000 to 2007. The present survey extends the series by obtaining data for 2008 and 2009. Consistent with the recommendations of the Coordination Committee on Science and Technology (CCST) Working Group on Metrics of Commercialisation (available at: http://www.dest.gov.au/NR/rdonlyres/E3170A75-79D5-4737-955E-BE41714948E8/16499/ FinalMoCReport15April2006.pdf), this survey is based on a broad definition of 'research commercialisation'. The definition includes and goes beyond a focus on commercialisation based on intellectual property rights in the form of patents, to also include research contracts and consultancies, and skills development and transfer.

Previous NSRC reports covering the period from 2000 to 2007 are available at the following link:

 http://www.innovation.gov.au/Section/Innovation/Pages/ TheNationalSurveyofResearchCommercialisation.aspx You may wish to refer to previous NSRC reports for assistance in responding to some questions, noting however that the current iteration of the survey has changed from the proceeding one in relatively significant ways.

USING THE EXPLANATORY NOTES

These Explanatory Notes are divided into two sections.

- Section 1 provides general guidance on the survey and matters that relate to all questions.
- Section 2 addresses each question and provides definitions for key terms.

CONTACTS

If assistance is required when completing the NSRC regarding:

- institution wide coordination of the survey response; and,
- final submission of the data on behalf of your institution,

please contact your Institutional Contact Officer (ICO).

For further guidance in completing this survey, please contact either:

Mr Brett Still Phone: (02) 6276 1045 Email: Brett.Still@innovation.gov.au Facsimile: (02) 6276 1463

Or,

Dr Nick Yazidjoglou Phone: (02) 6276 1739 Email: Nick.Yazidjoglou@innovation.gov.au Facsimile: (02) 6276 1463

If making contact by telephone, please call weekdays between 9 am and 5 pm AEST. Please also use the above Department contact details for submitting any additional information via email, facsimile or post.

SURVEY TIMING

The survey is being conducted over five weeks, from 16 August 2010 to 20 September 2010 inclusive.

REPORTING YEAR

All data collected via the survey will be reported on a calendar year basis. It is therefore requested that data be provided for the relevant calendar year.

If your institution collects data sought by the NSRC on a financial year basis, please supply the two sets of financial year data for the relevant calendar year in the 'comments' area of the particular question.

'NIL' AND 'NOT APPLICABLE' RESPONSES

For questions where your institution has no activity, we seek a response of 'nil' (ie, "0") so that the response can be differentiated from a missing response. A missed (or null) response will be assumed to be equivalent to zero, except where other reported values imply a non-zero value in which case the value may be inferred.

ESTIMATES OF RESPONSES

In instances where you do not have exact data, please provide your best estimate and an explanation of your estimating method in the comments field at the end of the form. For example, if you are unable to provide disaggregated data against given metrics (for example, disaggregating contracts from consultancies) it is recommended that you use one of the following three methods:

- Where you are confident that the split is almost completely or is entirely complete in one category, allocate 100% to that category;
- Where you have a sense of what the split is, you may assign proportionate amounts to the split (for example if there are two categories you may choose to apportion 70% to one category and 30% to the other);
- Where you are completely unsure, you may wish to assign equivalent proportions of your output against that question to each of the components of it (where there are three categories, you would choose 1/3).

FRACTIONAL RESPONSES

Where your institution shares ownership or responsibility for a reporting unit (e.g. a patent or income from a licence) and you are able to identify that proportion, please report on that fraction to the second decimal point (e.g. a one third share would be reported as 0.33). If you are unable to identify the proportion, report it as a whole share.

Specific guidance on this issue is provided in the Explanatory Notes to relevant questions.

COOPERATIVE RESEARCH CENTRES

Data for Cooperative Research Centres (CRC) will be obtained through the CRC Programme and reported separately to this survey. As such, institutions who are members of CRCs **should not report any research commercialisation information that relates to their participation in the CRC Program unless otherwise indicated**. This includes costs, staffing, outputs (such as patents and spin-out companies) and revenues (such as licensing income or research consultancies and contracts) information.

Specific guidance on this issue is provided in the Explanatory Notes to relevant questions.

CURRENCY

Please report all financial values in Australian dollars.

EXPLANATORY NOTES SECTION 2: QUESTIONS AND DEFINITIONS

PART 1: PRELIMINARIES

Question 1.

Provision of Australian Business Number(s) (ABN) and/or Australian Company Number(s) (ACN).

Please enter all of the ABNs/ACNs used or potentially used by your institution in the lodging of patent applications and in the earning of commercialisation earnings.

Research and Development Expenditure

Question 2a.

RESEARCH AND EXPERIMENTAL DEVELOPMENT EXPENDITURE: all expenditure on Research and Development (R&D). The definition of R&D, as given by the Australian Bureau of Statistics (ABS) in its surveys of 'Research & Experimental Development', 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".

Business:

- for calendar year 2008 please use the AVERAGE of the financial year R&D expenditure figures for financial years 2007-08 and 2008-09 reported by your institution in response to the annual ABS Surveys of Research & Experimental Development (Catalogue Number 8104.0):
 - http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/BAE5FB25
 D2121F6DCA2568A9001393EF?opendocument
- for calendar year 2009 please use an IN HOUSE estimate / calculation of R&D expenditure.

Government and Private Non-Profit Organisations:

- for calendar year 2008 please use the AVERAGE of the financial year R&D expenditure figures for financial years 2007-08 and 2008-09 reported by your institution in response to the bi-annual ABS Survey of Research & Experimental Development, 2008-09 (Catalogue Number 8109.0):
 - http://www.abs.gov.au/ausstats/abs@.nsf/ProductsbyCatalogue/0AE638AFEA2
 90E1BCA256964007CF648?OpenDocument
- for calendar year 2009 please use an IN HOUSE estimate / calculation of R&D expenditure using the same financial year methodology as specified overleaf.

Higher Education Organisations:

- for calendar year 2008 please use the 2008 calendar year R&D expenditure figure reported by your institution in response to the bi-annual ABS Survey of Research and Experimental Development, 2008 (Catalogue Number 8111.0):
 - http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/AE02B963
 FB1D51B2CA2571B60075B1C0?opendocument
- for calendar year 2009 please use an IN HOUSE estimate / calculation of R&D expenditure.

If your institution did not respond to the ABS Surveys of Research & Experimental Development referred to above, please provide an **IN HOUSE** estimate / calculation of R&D expenditure for the relevant calendar year.

If your institution participates in a Cooperative Research Centre (CRC), include research expenditure related to your institution's role as a CRC participant.

Exclude any amount for a Capital Use Charge (which is paid back to the government for accrual accounting purposes) applied in the relevant year. Relevant only to Australian Government organisations.

Question 2b.

END DATE: Please refer to the end date associated with the survey that you completed in relation to question 2a, i.e. either 30 June 2009 or 31 December 2009.

PART 2: INTELLECTUAL PROPERTY

Part two is structured to broadly follow the Intellectual Property (IP) commercialisation process, i.e. from resourcing, through invention disclosure, to licensing and spin-out formation.

INTELLECTUAL PROPERTY COMMERCIALISATION ACTIVITIES are activities associated with the identification, documentation, evaluation, protection, marketing, and licensing of technology (including trademarks but not insignia) and intellectual property management in general. It encompasses activities such as assisting with the negotiation of research agreements, Material Transfer Agreements (MTA), reporting of inventions to sponsors, and all other duties performed by the office. Specific inclusions or exclusions are addressed in the notes for each question.

Resourcing

Question 3.

For all elements to this question staff who are either direct employees of the respondent organisation, or are employed by them through an out-sourced employment mechanism should be counted.

- a. DEDICATED LEGAL STAFF: person(s) employed by the institution in either full or fractional Full Time Equivalent (FTE) allocation whose duties are specifically and solely concerned with legal issues in a commercialisation context; such as licence agreement drafting and negotiation in support of commercialisation.
- b. DEDICATED MARKETING STAFF: person(s) employed by the institution in either full or fractional FTE allocation whose duties are specifically and solely concerned with marketing issues in a commercialisation context; such as marketing of technology in support of commercialisation.
- c. DEDICATED COMMERCIALISATION STAFF: person(s) employed in the institution in either full or fractional FTE allocation whose duties are specifically involved with

commercialisation activities; such as licensing and patenting processes: licensee solicitation; technology valuation; and start-up activity efforts, and which are not included in 3a or 3b.

- d. INDUSTRY/COMMUNITY ENGAGEMENT STAFF: person(s) employed either as full time or fractional FTE allocation whose duties and responsibilities are specifically and solely concerned with industry or community engagement activities; such as initiating, negotiating and managing contracts and consultancies or organising community information sessions.
- e. OTHER COMMERCIALISATION SUPPORT STAFF: person(s) employed either as full time or fractional FTE allocation whose duties and responsibilities are to provide professional, administrative, or staff support of COMMERCIALISATION ACTIVITIES that are not otherwise included in DEDICATED COMMERCIALISATION STAFF. Such duties might include: management; compliance reporting; licence maintenance; negotiation of research agreements; contract management; accounting; Material Transfer Agreement (MTA) activity; and general office activity, including general secretarial/administrative assistance.

Include FTEs working on commercialisation through licensing, sale of intellectual property or formation of start-up companies. Please note FTEs reported may or may not have a formal commercialisation or similar job title and may or may not have been in an organisational unit with 'commercialisation' or 'technology transfer' in its title, i.e. a commercialisation office or company.

Exclude external legal counsel. Do not include people working on contracts for research (other than as part of licensing), course delivery, consulting or other activities.

f. TOTAL: all the direct and indirect salary and related costs of the staff reported for questions 3a, 3b, 3c, 3d and 3e.

Include:

- wages;
- on-costs (including tax, superannuation, leave accruals and all allowances); and,
- administration and infrastructure (including travel, building, office and consumables).

In instances where you do not have adequate data, please provide your best estimate and an explanation of your estimating method in the comments field at the end of the form. If you are unable to provide disaggregated data against given metrics (for example, contracts and consultancies) it is recommended that you use one of the following three methods:

- Where you are confident that the split is almost completely or is completely in one category, allocate 100% to that category;
- Where you have a sense of what the split is, you may assign proportionate amounts to the split (for example if there are two categories you may choose to apportion 70% to one category and 30% to the other);
- Where you are completely unsure, you may wish to assign equivalent proportions of your output against that question to each of the components of it (where there are three categories, you would choose 1/3 split).

Question 4.

a. MARKETING: costs incurred in marketing activities, that is, in direct promotion of services either via printed material, web site construction/maintenance, market research, or through the hosting of forums or promotion specific events. The aim of this question is to capture the total marketing costs other than staff and IP protection costs.

Exclude employment and legal costs.

b. OTHER: other costs incurred (eg. subscription to, or purchasing of, databases)

Exclude employment and legal costs.

c. TOTAL: all the costs reported for questions 4a and 4b.

Question 5.

EXTERNAL FEES AND LEGAL COSTS: the amount spent by your institution in fees for patents, plant breeder rights, copyright, trade marks, maintaining patents filed in prior years and/or registered designs.

Include all fees and costs associated with:

- patent applications;
- securing background IP; and
- external legal fees may include: patent and copyright prosecution including patent searches; maintenance; and interference costs; as well as minor litigation expenses that are included in everyday office expenditures (an

example of a minor litigation expense might be the cost of an initial letter to a potential infringer written by counsel).

Exclude direct payment of any of these costs by licensees (see question 6 for patent fee reimbursements from licensees), and legal fees for contract drafting or advice.

Question 6.

If no answer is provided for Question 5, please proceed directly to Question 7.

PATENT/LEGAL FEES REIMBURSEMENTS: the amount reimbursed by licensees to the institution for EXTERNAL FEES AND LEGAL COSTS (reported in question 5a).

Include patent fee recovery only.

Exclude all other licence revenue.

Question 7.

Please record the number of invention disclosures your institution received.

Patent and Plant Breeder Rights Applications

Question 8.

TOTAL APPLICATIONS

Include (and only include):

- provisional applications;
- provisional applications that are converted to regular applications;
- new filings (such as Patent Cooperation Treaty (PCT) and National Phase applications);
- all plant breeder rights applications; and
- if applicable to Australia, the US or elsewhere, Continuations-In-Part (CIP), continuations, divisionals, and reissues.

NEW APPLICATIONS

A provisional application filed in the reporting year may be counted as new. If a provisional application is converted in the reporting year to a regular application, then the corresponding regular application should not be counted as new.

Exclude:

continuations;

- divisionals;
- reissues;
- continuations-in-part;
- all activity for Cooperative Research Centres where your institution is a participant; and
- all activity undertaken with Australian Universities if you are a Medical Research Institute (unless you establish that your partner Australian University will not be counting your joint activity in their survey return).

Note: All patents in a single patent family, including when filed in multiple jurisdictions, are to be included. For example, A PCT is counted as one application. When a PCT progresses to national phase in a specific country, this is counted as a separate application.

Fractional reporting: where your institution (or its commercialisation company) is a party to a joint patent application, please report accordingly to the second decimal point. For example, if there are three parties listed on the patent application, then report your institution's share as 0.33.

Question 9.

Note: the total for this question may be greater than the total provided for 8dii as this question concerns broader forms of registered IP beyond patents. The sum of the elements a – f of this question however should be representative of the values provided for the previous question.

- a. PROVISIONAL PATENTS: a form of patent available through both Intellectual Property Australia (IPA) and the United States Patent and Trademark Office (USPTO) as a lower cost first patent filing option.
- b. PATENT COOPERATION TREATY PATENTS: a form of patent open to States party to the Paris Convention for the Protection of Industrial Property, administered by the World Intellectual Property Organisation (WIPO). PCTs offer inventors and industry a route for obtaining national patent protection in Contracting States by filing an 'international' patent application.
- c. INNOVATION PATENTS: in Australia these are a protection option that is designed to protect inventions that are not sufficiently inventive to meet the inventive threshold required for standard patents.

- d. NATIONAL PHASE: when an international PCT application proceeds separately in any or all of the countries which are party to the PCT or when a complete specification is filed directly in a country.
- e. DIVISIONALS: an application to protect your rights if more than one invention is described in a complete patent specification.
- f. PLANT BREEDER RIGHTS: a form of intellectual property providing exclusive commercial rights to a registered plant variety.
- g. REGISTERED DESIGNS: a commercial legally enforceable right to use, license or sell a design. Design refers to the features of shape, configuration, pattern or ornamentation which, when applied to a product, gives the product a unique appearance
- . TRADEMARKS: a commercial legally enforceable right to use a letter, number, word, phrase, sound, smell, shape, logo, picture, aspect of packaging, or any combination of these, used to distinguish goods and services of one trade from those of another.
- i. OTHER: Any other types of non-patent registered IP rights applications not addressed above.
- j. TOTAL: sum of the applications reported for 9a, 9b, 9c, 9d, 9e, 9f, 9g, 9h and 9i.

Exclude all activity for Cooperative Research Centres where your institution is a participant.

Note: All patents in a single patent or plant breeder rights family including when filed in multiple jurisdictions are to be included. For example, a PCT is counted as one application. When a PCT progresses to national phase in a specific country, this is counted as a separate application.

Fractional reporting: where your institution (or its commercialisation company) is a party to a joint patent application, please report accordingly to the second decimal point. For example, if there are three equal parties to the patent application, then report your institution's share as 0.33.

Other registered IP rights applications: if you entered a non-zero value in the "Other" category please specify what forms of IP rights you undertook in relation to your recorded activity.

Question 10.

PATENT and PLANT BREEDER RIGHTS FAMILY: a group of patent or plant breeder rights applications or grants emanating from a single filing.

Note: this question only concerns <u>patent and plant breeder rights families</u>, and is not in reference to families of other forms of registered IP (i.e.trademarks).

Patents and Plant Breeder Rights Issued (Including Renewals)

Question 11.

Include: the number of patents and plant breeder rights issued to your institution in the reporting year.

Exclude all activity for Cooperative Research Centres where your institution is a participant.

Note: All patents in a single patent family, including when filed in multiple jurisdictions, are to be included. For example, a PCT is counted as one application. When a PCT progresses to national phase in a specific country, this is counted as a separate application.

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share as 0.25.

Question 12.

PATENT and PLANT BREEDER RIGHTS FAMILY: a group of patent or plant breeder rights applications or grants emanating from a single filing.

Patent and Plant Breeder Rights Holdings

Question 13.

This question is asking for a snapshot of your institution's total patent and/or plant breeder rights holdings on the last day of the reporting period, with separate counts for pending and issued.

a. PATENTS/PLANT BREEDER RIGHTS PENDING:

Include:

all provisional patents;

- PCT patents; and
- national phase filings.

b. PATENTS/ PLANT BREEDER RIGHTS ISSUED:

Include patents and Plant Breeder Rights accepted and allowed by patent offices.

Exclude all activity for Cooperative Research Centres where your institution is a participant.

Note: All patents or plant breeder rights in a single patent family, including when filed in multiple jurisdictions, are to be included. For example, a PCT is counted as one application. When a PCT progresses to national phase in a specific country, this is counted as a separate application.

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share as 0.25.

Question 14.

PATENT and PLANT BREEDER RIGHTS FAMILY: a group of patent or plant breeder rights applications or grants emanating from a single filing.

Question 15.

Include:

- all provisional patent applications;
- PCT and national phase applications; and
- granted patents.

Exclude all activity for Cooperative Research Centres where your institution is a participant.

Fractional reporting: where your institution (or its commercialisation company) was a joint owner of a patent, please report accordingly to the second decimal point. For example, if your institution had a quarter share in a patent, then report your institution's share as 0.25.

Licences / Options / Assignments

A LICENCE agreement formalises the transfer of technology between two parties, where the owner of the technology (licensor) grants rights to the other party (licensee).

An OPTION agreement grants the potential licensee a time period during which it may evaluate the technology and negotiate the terms of a licence agreement. An option agreement is not constituted by an Option clause in a research agreement that grants rights to future inventions, until an actual invention has occurred that is subject to that Option.

An ASSIGNMENT agreement conveys all right, title and interest in and to the licensed subject matter to the named assignee.

BACKGROUND INTELLECTUAL PROPERTY: Pre-existing Intellectual Property not created as part of the research project and which is required by the originators for the purposes of exercising their rights with respect to the research project.

Note: this includes only Licences / Options / Assignments (LOA) negotiated on full commercial terms, granting access to institutional intellectual property (patented or otherwise) in return for royalties or licence fees.

In instances where you do not have adequate data, please provide your best estimate and an explanation of your estimating method in the comments field at the end of the form. For example, if you are unable to provide disaggregated data against given metrics (for example, contracts and consultancies) it is recommended that you use one of the following three methods:

- Where you are confident that the split is almost completely or is completely in one category, allocate 100% to that category;
- Where you have a sense of what the split is, you may assign proportionate amounts to the split (for example if there are two categories you may choose to apportion 70% to one category and 30% to the other);
- Where you are completely unsure, you may wish to assign equivalent proportions of your output against that question to each of the components of it (where there are three categories, you would choose a 1/3 split).

Question 16.

a. MATERIAL TRANSFER AGREEMENT: An agreement outlining conditions under which material is provided from the owner to another entity for a specific use.

b. INCOME: please sum all earnings achieved through the supplying of an MTA.

Exclude:

 Implicit or explicit MTA rights granted under licence or under terms of a research contract.

Note: This question only applies to MTAs in which the institution is providing its "materials" to an external business user, and does not apply for agreements where the institution is the recipient of materials.

Question 17.

- a. EXECUTE: Count the number of LOAs that were executed in the year indicated for all technologies. Each agreement, exclusive or non-exclusive, should be counted separately.
- b. ACTIVE: 'Legally enforceable' licences and options that earned income in the reporting year, or which are contracted to provide income in future years and for which there is a reasonable expectation that income will be paid, or, when there is no financial consideration associated with the LOA, that the LOA reflects a continuing relationship between parties.

Include:

- LOAs generated as a result of competitive research grant projects (e.g. Australian Research Council Linkage Grants and National Health & Medical Research Council Development Grants), including where LOAs are provided to industry participants;
- Multiple individual licences for the same software product worth \$1,000 or more (per package) must be counted as a single technology licence. This applies irrespective of whether the product is patent protected or not; and
- Licences and Assignments to other research institutions, including those provided as inputs to Cooperative Research Centres.

Exclude:

- MTAs, including the provision of biological material (this is captured in question 16);
- Licences granted in research contracts to an institution (and thereby an institution's researchers) enabling researchers the freedom to operate for the purposes of teaching and undertaking further research for the project identified in the research contract;

- Provision for the use of institutional background intellectual property within a licencing agreement should not be separately counted;
- LOAs generated as a result of work completed by Cooperative Research Centres, that is as CRC outputs (this information will be obtained separately through the CRC Programme); and
- LOAs for individual (personal) use software licences.

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly, to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share of the LOA as 0.25.

In instances where you do not have adequate data, please provide your best estimate and an explanation of your estimating method in the comments field at the end of the form. For example, if you are unable to provide disaggregated data against given metrics (for example, contracts and consultancies) it is recommended that you use one of the following three methods:

- Where you are confident that the split is almost completely or is completely in one category, allocate 100% to that category;
- Where you have a sense of what the split is, you may assign proportionate amounts to the split (for example if there are two categories you may choose to apportion 70% to one category and 30% to the other);
- Where you are completely unsure, you may wish to assign equivalent proportions of your output against that question to each of the components of it (where there are three categories, you would choose a1/3 split).

Question 18.

- a. AUSTRALIAN OWNED AND AUSTRALIAN BASED COMPANIES / ORGANISATIONS: companies that are majority Australian owned with operations within Australia.
- b. AUSTRALIAN OWNED AND FOREIGN BASED COMPANIES / ORGANISATIONS: companies majority owned in Australia with no operations within Australia.
- c. FOREIGN OWNED AND AUSTRALIAN BASED COMPANIES / ORGANISATIONS: companies majority owned overseas with operations within Australia.
- d. FOREIGN OWNED AND FOREIGN BASED COMPANIES / ORGANISATIONS: companies majority owned overseas with no operations within Australia.

e. UNKNOWN: companies for which the ownership status is unclear or not determined.

Note: The jurisdictional ownership status specified should be determined in relation to the arm, division or local status of the office with which the negotiations are formally concluded.

Question 19.

This question refers to LOAs identified in question 17b.

See notes for question 20 for details of types of income to be included.

Exclude all activity for Cooperative Research Centres where your institution is a participant.

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly, to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share as 0.25.

Question 20.

The yearly number totals for question 20 should be the same as the relevant values supplied for question 19.

LOA INCOME includes the gross amount (before deduction of service fees, if any) of: licence issue fees; payments under options; annual minimums; running royalties; termination payments; the amount of equity received when cashed-in; and software end-user licence; but not research funding; patent expense reimbursement; a valuation of equity not cashed-in; software and biological material end-user licence fees; or trademark licensing royalties from university insignia. LOA income also does not include income received in support of the cost to make and transfer materials under Material Transfer Agreements.

EQUITY is ownership interest (e.g. stock and rights to receiving stock) in a start-up company which was dependent upon the licensing of IP or the bestowing of tacit knowledge from your institution or its commercialisation company in order to become operational.

a. RUNNING ROYALTIES: Royalties earned on the sale of products. Excluded from this number are licence issue fees, payments under options, termination payments, and the amount of annual minimums not supported by sales.

- b. CASHED-IN EQUITY: This includes the amount received from cashing in EQUITY holdings, resulting in a cash transfer to the institution (or its commercialisation company). The amount reported should be reduced by the cost basis, if any, on which the EQUITY was acquired. Excluded from this amount is any type of analysis or process whereby a value for the EQUITY holdings is determined but a cash transaction does not take place through the sale of these holdings.
- c. OTHER: Any remaining types of LOA INCOME not covered by RUNNING ROYALTIES or CASHED-IN EQUITY.

Exclude:

- all activity for Cooperative Research Centres where your institution is a participant;
- in-kind contributions; and,
- earnings from Material Transfer Agreements.
- d. TOTAL: sum totals for the numbers and incomes reported for 20a, 20b and 20c.

Optional: If "other" income category is applicable, you may optionally indicate the form(s) and value of the associated income(s) in the text field provided.

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly, to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share as 0.25.

Question 21.

The yearly totals for question 21 should be the same as the relevant values supplied for question 19, and the number totals for question 20.

Please report on cash based transactions only. If you wish to identify other forms of income (e.g. in kind contributions), these can be reported in the free text field question (35).

Fractional reporting: where your institution (or its commercialisation company) is a joint owner of a patent, please report accordingly to the second decimal point. For example, if your institution has a quarter share in a patent, then report your institution's share as 0.25.

Question 22.

LOA income paid to other institutions or commercial entities will be used to help identify any double-count of LOA income reported under this survey.

Include cash amounts paid to other institutions under inter-institutional agreements.

Exclude:

- fees for background IP and expert advice (reported in question 5); and,
- in kind payments, please report cash payments only.

Capital Raising, Initial Public Offerings and Equity

Question 23.

- a. INITIAL PUBLIC OFFERING (IPO): refers to when a company first sells its shares to the public.
- b. OTHER CAPITAL RAISING ACTIVITIES: capital raised through activities other than IPO(s), including post-float share offers, private share offers, etc.
- c. TOTAL FINAL CAPITAL RAISED: refers to the total amount of capital raised through the IPO(s) and/or other capital raising activities.

Optional: If "other" capital raising category is applicable, you may optionally indicate the form and value of the associated capital raising in the text field(s) provided.

Question 24.

82

This question asks for the value of current EQUITY holdings as at the end of the reporting period. It is not intended to capture the proceeds of capital investments in companies, or general investments in the share market.

EQUITY is ownership interest (e.g. stock and rights to receiving stock) in a start-up company which was dependent upon the licensing of IP or the bestowing of tacit knowledge from your institution or its commercialisation company in order to become operational.

An equity position in a currently government funded CRC should not be included. Equity in companies spun out of CRCs as separate entities that required no direct funding from the CRC Program may be included. Similarly, equity in organisations that were Commonwealth funded CRCs but have exited the program and where a market value for the organisation has been established can be counted.

Valuations must be independently determined based upon a market assigned valuation of the organisation or must be derived in a manner that is consistent with the application of the International Financial Reporting Standards. The following guidelines may assist:

- Value of all equity holdings refers to equity that is related to the licensing/ intellectual property assignment activity of the institution.
- If your institution holds equity in a publicly-traded/listed company, use the market price of your institution's holdings on the closing day of the period for which you are reporting.
- If your institution held equity in a private company, use the price established in the most recent transaction as the fair market price. For example, if you formed a company with an investor in 2007 and they put in \$3 million for 60% of the company and there have been no more investments since, then your value for both years (2008-2009) will be \$2 million (i.e. the institution's 40% share value). If there have been no transactions, treat value as zero.

Question 25.

This question asks for the number and value of EQUITY holdings exited as at the end of the reporting period. It is not intended to capture the proceeds of capital investments in companies, or general investments in the share market.

EQUITY is ownership interest (e.g. stock and rights to receiving stock) in a start-up company which was dependent upon the licensing of IP or the bestowing of tacit knowledge from your institution or its commercialisation company in order to become operational.

Value, in some cases, may be difficult to determine. As a general principle, please ensure that valuations used to arrive at this figure are consistent with the International Financial Reporting Standards (see question 24).

Start-up Companies

Question 26.

START-UP COMPANIES: companies or traders as persons engaged in businesses that were partially or entirely dependent upon licensing or assignment of your institution's technology for initiation.

OPERATIONAL: a company is operational when it possesses sufficient financial resources and expends these resources to make progress toward stated business goals. The company must also be diligent in its efforts to achieve these goals.

EQUITY: an ownership interest in a company (e.g. stock and/or rights to receiving stock) by your institution or its commercialisation company.

Include start-up companies that were created in the five years up to and including the reporting date for the question.

Exclude start-up companies that were created greater than five years before the reporting period for the question.

Question 27.

This question asks for the number of start-up companies that CEASED operations in the reporting period, irrespective of their date of commencement.

START-UP COMPANIES: companies or traders as persons engaged in businesses that were partially or entirely dependent upon licensing or assignment of your institution's technology for initiation.

OPERATIONAL: a company is operational when it possesses sufficient financial resources and expends these resources to make progress toward stated business goals. The company must also be diligent in its efforts to achieve these goals.

Question 28.

This question asks you to nominate how many start-up companies your organisation launched in the survey reporting years. You will then be prompted to provide details for EACH of those companies via drop-down sub-forms.

PART 3: RESEARCH CONTRACTS, CONSULTANCIES AND DIRECT SALES

Question 29.

RESEARCH CONTRACTS, CONSULTANCIES AND DIRECT SALES is considered to include:

- consultancy agreements and contracts for the conduct of research on behalf of clients external to your institution;
- consultancy agreements for the provision of expert advice based on your institution's existing research knowledge, skcontracts with partners in grant funded research, but do not include the funding from the granting agency;
- research contracts and consultancies with partners in competitive research grant projects (e.g. Australian Research Council Linkage Grants and National Health & Medical Research Council Development Grants), but not contracts or agreements with the granting agency itself; and
- Direct sale by your institution of physical products generated by your institution which embody technology-based IP (as opposed to the provision of research or expertise).

Exclude:

- earnings from Material Transfer Agreements already mentioned in question 16;
- earnings from software sales already mentioned in question 17;
- sales of products able to be bought through retail outlets; and
- direct sales of goods which embody non-technology based IP (eg. university press books and audio-visual products)

RESEARCH is considered to include:

- 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;
- Any activity classified as research which is characterised by originality; it should have investigation as a primary objective and should have the potential to produce results that are sufficiently general for humanity's stock of knowledge (theoretical and/or practical) to be recognisably increased. Most higher education research work would qualify as research; and

 Pure basic research, strategic basic research, applied research and experimental development.

GROSS CONTRACT VALUE: the full contracted value of the work, regardless of whether any or all payments were made in the reporting year. Contracts and consultancies should only be indicated if they were executed in the year specified: continuing contracts and consultancies executed in previous years should not be represented in any out years. Where the contract is not for a fixed price but for services at a capped rate, count the capped value of the contract. Please report cash value only; in-kind contributions can be reported in the free text provided in question 35.

In instances where you do not have adequate data, please provide your best estimate and an explanation of your estimating method in the comments field at the end of the form. For example, if you are unable to provide disaggregated data against given metrics (for example, contracts and consultancies) it is recommended that you use one of the following three methods:

- Where you are confident that the split is almost completely or is entirely complete in one category, allocate 100% to that category;
- Where you have a sense of what the split is, you may assign proportionate amounts to the split (for example if there are two categories you may choose to apportion 70% to one category and 30% to the other;
- Where you are completely unsure, you may wish to assign equivalent proportions of your output against that question to each of the components of it (where there are three categories, you would choose 1/3).

Question 30.

The total at question 30a.vii, 30b.vii and 30c.vii must be the same as the figure supplied at question 29a, 29c and 29e respectively.

PART 4: SKILLS DEVELOPMENT AND TRANSFER

Question 31.

TRAINING IN COMMERCIALISATION AND ENTREPRENEURSHIP: refers to educational, training and development programs aimed at research staff or higher degree by research students that seeks to develop skills in and/or understanding of the research commercialisation process, i.e. translating research outputs into marketable products, processes and services.

a. Include students who are accessing the Commercialisation Training Scheme.

Exclude training which is provided to researchers or research students in their capacity as participants in a CRC.

Question 32.

Only consider relevant FTEs who were employed* during the course of each reporting period, irrespective of when the start-up company was launched. Employees who commenced their employment prior to 1 January 2007 (for 2008 reporting period) or 1 January 2008 (for the 2009 reporting period) should not be considered. That is:

- For 2008 consider any employee, whether they first commenced start-up employment in 2007 or 2008, but only report their 2008 FTE employment.
- For 2009 consider any employee, whether they first commenced start-up employment in 2008 or 2009, but only report their 2009 FTE employment.
 - a. **Note:** this part of this question is intended to establish the total number of research postgraduate students finding employment in start-up companies.
 - b. **Note:** this part of question is intended to establish the total number of your institution's employees working with institutional IP dependent start-ups.

Note: The above is only to apply to start-up companies which were still operational at the end of the reporting year.

Include individuals who were employed by your institution but were employed full time or part time for the purposes of working in the start-up company ("Virtual employees").

PART 5: ADDITIONAL INFORMATION

Question 33.

This question provides the opportunity to:

- list any other commercialisation activities your institution undertook not already captured in this questionnaire;
- provide information on estimated responses in relevant questions; and
- provide examples of where your institution's expertise was critical to an enterprise obtaining commercial benefit.

Where you provide additional information for a specific question, please identify that question here.

PART 6: SURVEY PROCESS

Question 34.

Nil.

Question 35.

Nil.

Question 36.

Please enter the details for the individual primarily responsible for entering the data into the online form. The nominated individual would be contacted in the event of there being any queries in respect of the form.

APPENDIX 4. START-UP COMPANIES FORMED IN 2008 AND 2009

Table 31: Start-up companies formed in 2008

Institution	Name of company	ABN or ACN
Medical Research Institutes		
Burnet Institute	SeeD4 Pty Ltd	63136355443
Women's and Children's Health Research Institute	AbRegen Pty Ltd	129282800
Publicly Funded Research Agencies		
NICTA	Monitoring Division Inc	50 129 284 911
Universities		
James Cook University	GRW Industries Pty Ltd	18136100831
Murdoch University	Cellumina Pty Ltd Spirogene Pty Ltd	130525745 86126864846
Swinburne University of Technology	Image Cytometrics Pty Ltd	43 134 536 093
The Australian National University	Savine Therapeutics Pty Ltd	40128146869
The University of Adelaide	Punchcard Visual Technologies Pty Ltd	130167832
The University of Melbourne	Cfar Pty Ltd Fibrotech Therapeutics Pty Ltd Manjrasoft Pty Ltd	132404338 119745970 131660270
The University of Queensland	Corpison Pty Ltd Lightanate Pty Ltd Progel Pty Ltd	66 132 702 713 80 134 358 491 79 134 692 649

Table 32: Start-up companies formed in 2009⁴¹

Institution	Name of company	ABN or ACN
Medical Research Institutes		
Institute for Eye Research	Adventus Technology Australia P/l	85138617062
Publicly Funded Research Agencie	S	
NICTA	Goanna Software Pty Ltd mContext Pty Ltd	63136479448 67 136 479 466
Universities		
Bond University	Bond Innovation Ltd Bond R&D 1 Ltd	92 128 891 056 98 128 891 083
Central Queensland University	Rail Innovation Australia	83112445995
Curtin University of Technology	Deepvision 3d Pty Ltd HiSeis Pty Ltd Icetana Pty Ltd	139628292 83136507429 140449725
Flinders University	Vital Signs SA Pty Ltd	12135776528
James Cook University	South Pacific Seaweeds	40 138 898 469
The Australian National University	Digitalcore Pty Ltd Mylexa Pty Ltd	60129061374 58133738753
The University of Adelaide	SNAP Network Surveillance Pty Ltd	68 138 594 386
The University of Melbourne	BACE Therapeutics Pty Ltd Otifex Therapeutics Pty Ltd Procypra Therapeutics Pty Ltd	141159846 139663728 136508775
The University of Queensland	Australian Tropical Abalone Pty Ltd Ceramipore Pty Ltd GRW Industries Millipede Forming Pty Ltd Neo-Rehab Pty Ltd NuNerve Pty Ltd South Pacific Seaweeds Pty Ltd Warrapharm Pty Ltd	79 140 510 345 49 136 951 178 18 136 100 831 42 134 692 872 64 136 101 016 68 141 223 538 40 138 898 469 84 135 218 718
University of Wollongong	Warrapharm Pty Ltd	84 135 218 718

⁴¹ The University of South Australia had one start-up company for 2009 but no details were provided. Warrapharm Pty Ltd is a joint venture between The University of Queensland and the University of Wollongong. South Pacific Seaweeds is a joint venture between James Cook University and The University of Queensland.

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