



Australian Government

Advisory Council on Intellectual Property



Collaborations between the Public and Private Sectors:

The Role of Intellectual Property

FINAL REPORT

September 2012

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The Advisory Council on Intellectual Property

The Advisory Council on Intellectual Property (the Council or ACIP) is an independent body appointed by the Australian Government. ACIP advises the Federal Minister for Industry and Innovation, and his Parliamentary Secretary, on intellectual property matters and the strategic administration of IP Australia.

The Council was established in 1994. Membership of the Council reflects a cross-section of stakeholders of the IP system, including representatives from both small and large business, professional associations, and academia.

Senior representatives from the Department of Industry, Innovation, Science, Research and Tertiary Education assisted ACIP with this review.

Information on the Council, its publications and current work program can be found at www.acip.gov.au or by contacting the ACIP Secretariat on mail.acip@ipaustralia.gov.au.

Foreword

The Australian Government is committed to increasing the level of collaborations between business, universities and other publicly-funded research organisations (PFROs).

This report identifies important factors that affect the formation and operation of collaborations, and includes recommendations on how these can be improved. Specifically, it looks at the role of intellectual property (IP) and how it acts as an enabler or disabler.

Consistent with the terms of reference, the Advisory Council on Intellectual Property (ACIP) also sought to identify other important factors. These factors are part of the broader innovation system and are referred to the Department of Industry, Innovation, Science and Research and Tertiary Education for consideration.

In preparing this report ACIP benefited from the input provided in written submissions, as well as from consultations with industry, universities, public research agencies, representatives of the government and other relevant organisations and research bodies. ACIP thanks all contributors.

The stakeholder consultations and preparation of this report were overseen by a working group comprising Adam Liberman, Professor Beth Webster and Ken Pettifer, with support from Vera Lipton of the ACIP Secretariat.

I would also like to thank Tony Weber and his staff at the Innovation Division, Department of Industry, Innovation, Science, Research and Tertiary Education for their assistance in undertaking this review.

Dr Noel Chambers
Chair

*ACIP Review of Collaborations Between the Public and Private Sectors:
The Role of Intellectual Property*

September 2012

Terms of reference

In June 2010, the then Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr, requested that the Advisory Council on Intellectual Property (ACIP)

Investigate and report on how intellectual property (IP) acts as an enabler or disabler of knowledge sharing, translational research and collaborations, particularly between the private and public sectors. The investigations should include consultations with key representatives of industry and publicly funded research organisations to identify what they consider to be problem areas of collaborations.

Background

The Australian Government has identified increased collaboration between the public and private sectors as a driver of innovation and economic growth. In recent years, concerns have been expressed, both in Australia and internationally, that IP may be inhibiting the formation of collaborations, but there is little empirical evidence documenting and assessing the role of IP.

In light of this, the Minister considered a study of collaborations was timely. He noted that the inquiry would likely unearth other issues, unrelated to IP, which also affect collaborations. The Minister recommended these issues be referred to the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) for consideration.

Scope of the inquiry

In conducting this review, ACIP recognised that collaborations between PFROs and private sector stakeholders take many forms, involve multiple stakeholders and cover different issues, many transactional rather than directly related to the substance of what constitutes the IP system.

ACIP also recognised that the IP system is only a sub-set of the innovation system and that the review draws on the linkages between IP and innovation. Collaboration with DIISRTE greatly assisted ACIP in undertaking this review.

As part of the review process ACIP independently sought views from:

- **private sector stakeholders** to identify the aspects of collaborations with Australian PFROs that work well and those that do not
- **PFRO representatives**—including the Australian Commonwealth Scientific and Research Organisation (CSIRO), the Australian National Nuclear Science and Technology Organisation (ANSTO), the Australian Institute of Marine Science (AIMS), the Defence Science and Technology Organisation (DSTO), Australian universities and medical research institutes—to identify

which aspects of collaborations with private sector stakeholders work well and which do not

- **major funders of PFROs**, including the Australian Research Council (ARC), the National Health and Medical Research Council (NHMRC) and philanthropic organisations.

The consultations collected information about:

- the frequency and types of collaborations between private sector stakeholders and Australian PFROs
- experiences with collaborations, including how matters involving IP arise and affect collaborations
- IP considerations in collaborations involving private and public sectors
- factors influencing negotiating of such collaborations
- outcomes typically achieved or not achieved in collaborations
- lessons learnt from collaborating or from attempting to collaborate.

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Summary

In June 2010, the then Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr, requested that the Advisory Council on Intellectual Property (ACIP) investigate and report on how intellectual property (IP) acts as an enabler or disabler of knowledge sharing, translational research and collaborations, particularly between the private and public sectors.

The inquiry collected information about collaboration models between industry and Australian publicly-funded research organisations (PFROs), and about experiences with such collaborations, including how matters involving IP arise and affect collaborations.

ACIP conducted this review in cooperation with the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE). The report documents the review's findings and recommendations.

The review found that, in most cases, **IP plays an important role in collaborations**. Stakeholders reported that IP attracts industry partners to work cooperatively with PFROs, and assists PFROs in obtaining additional research revenue. IP also helps to transfer certain types of knowledge between PFROs and industry, and to translate that knowledge into new technologies, products and services. In some instances IP was viewed as less relevant, depending on the purpose of the collaboration and type of industry.

The review also found that **IP cannot be looked at in isolation**. Other considerations are also important. From an industry perspective, these include awareness of opportunities to collaborate, availability and expertise of PFRO personnel and access to facilities and other infrastructure. From a PFRO perspective, major considerations include the availability of funding and resources, and the types of interactions formed with industry.

Respondents often confused IP with other issues involved in collaborations. They were using IP as a catch-all term to describe problems associated with many of the commercial issues that arise in transactions and negotiations. Where the issues raised did relate to IP, they involved the underlying negotiation position and lack of knowledge about IP.

The review's terms of reference anticipated that it may unearth issues unrelated to IP or the IP system. In fact, most issues identified in consultations were **not** related to the IP system but concentrated on the broader factors affecting the formation and implementation of collaborations. In line with the request from the Minister, ACIP refers these issues to DIISRTE for consideration, along with suggested recommendations.

In particular, there was a high level of agreement among PFRO and industry stakeholders that the current performance metrics for PFROs—especially for universities and medical research institutes (MRIs)—do not sufficiently encourage the formation of collaborations with industry.

ACIP found that industry and PFROs were generally satisfied with collaborations when they occurred. Nevertheless, there is scope to address specific issues to better serve the needs of both.

Review recommendations concentrate on two areas to improve the levels of collaborations:

- increasing the motivation of PFROs (especially universities) and PFRO researchers (particularly university researchers) to engage in collaborations with industry
- improving the ability of PFROs, PFRO researchers and industry to collaborate.

The specific issues identified are summarised below, in order of importance and perceived impact on the formation and operation of collaborations.

Issue 1. Motivating PFROs to collaborate

ACIP consultations found that the current performance metrics for PFROs in general, and universities and MRIs in particular, are not well geared towards encouraging the formation of collaborations with industry.

Those for universities (Excellence in Research for Australia (ERA)) do not measure the impact of university research. Hence, any associated incentives may not be sufficient to motivate them to engage with industry.

Furthermore many PFRO researchers were concerned that the reward structure did not encourage them to get involved in collaborations. Early career academics in particular said that they needed to focus on publishing and securing ARC and NHMRC grants—achievements that have the greatest impact on their career advancement.

ACIP considers that the key performance indicators (KPIs) for PFROs, particularly universities and MRIs, need rebalancing. KPIs are directly or indirectly linked to PFRO funding which, in turn, drives their behaviour and allocation of resources.

ACIP recommends developing mechanisms to increase the motivation of PFROs and their researchers to improve the level of collaborations with industry.

Issue 2. Aligning interests and expectations from collaborations

The review found that negotiating collaborations can present challenges, but collaborations improve over time and with experience. Several stakeholders pointed out that the alignment of different interests, expectations and objectives was the key to success and to expediting the negotiation process.

Negotiations between industry and the research sector were reported to work well at a technical level (researcher to researcher). Aspects of negotiations relating to the scope of work, definition of deliverables, project milestones and timeframes were typically easy to negotiate. However, delays and complexities occurred when issues such as the costing of contributions, ownership of IP rights, publication rights, insurance, warranties and indemnities came to be addressed. It was reported that these issues

change from project to project. As such, neither industry nor PFROs can pursue their preferred standard positions. Terms must be decided on a case-by-case basis.

Additionally, it is often researchers who initiate PFRO collaborations with industry and they may set expectations concerning commercial terms, even though they do not have the authority. This was reported to cause problems when those with authority seek to negotiate the deal and original expectations are not met.

ACIP believes that a faster alignment of expectations and better understanding of the commercial and IP issues involved in collaborations would assist with expediting negotiations.

ACIP recommends developing and promoting educational resources and tools to assist all stakeholders to form and conduct collaborations.

Issue 3. Helping SMEs to engage with PFROs

Based on ACIP's consultations, it appears that collaborations with small and medium enterprises (SMEs) are more problematic than those with larger businesses. ACIP identified several factors including:

- **Limited financial resources:** SMEs do not have the financial resources to be considered attractive potential collaborators for PFROs when compared to large businesses, and the transaction costs can be high relative to SMEs' financial resources
- **Availability of internal expertise and resources:** SMEs may lack internal expertise or lack knowledge or resources to hire external experts
- **Awareness:** many SMEs are unaware of what PFROs have to offer, or are unable to locate expertise within PFROs.

These factors also influence Australian PFROs which tend to prefer to collaborate with large firms.

While productivity growth relies considerably on the ability of firms to acquire and internalise knowledge developed elsewhere, Australian SMEs, like their international counterparts, appear, in general, to have difficulty in establishing collaborations with PFROs. This appears to affect some sectors more than others.

SMEs represent over 96 per cent of all business, generate at least 33 per cent of GDP and employ over five million Australians, or 63 per cent of all workers. Given their significance to the Australian economy, improving collaborations to intensify knowledge transfer and innovation could benefit Australia's productivity.

ACIP recommends taking steps to improve the ability of Australian SMEs to engage in collaborations with PFROs.

Issue 4. Increasing project management and skills in PFROs

A key issue consistently highlighted in consultations with industry was the lack of PFRO project management skills and experience on large, inter-organisational projects.

PFRO representatives concurred that the availability of professional project management skills would help facilitate and implement collaborations. However, many pointed out that they are often unable to hire project managers with industry experience.

ACIP considers that improving PFRO project management capabilities would significantly improve the operation of collaborations. Ideally, PFROs should engage properly trained project managers.

ACIP recommends that mechanisms be introduced to increase project management skills in PFROs, and that resources be allocated to support project management in PFROs.

Issue 5. Provisions in government contracts and grants

Many PFRO stakeholders shared the view that the standard terms sought by the Commonwealth when entering into research agreements with PFROs, or providing grant funding to PFROs, can be unnecessarily onerous or impractical.

These terms can cause difficulties when PFROs subsequently seek to collaborate with industry, and to use the results of the research developed under the agreements with the Commonwealth.

Four issues were highlighted:

1. Broad compulsory background and project IP licences required by the Commonwealth.
2. Broad warranties to the effect that background IP and project IP will not infringe the rights of any third party.
3. Broad indemnities in general.
4. Onerous moral rights provisions relating to PFRO authors, particularly academic authors.

ACIP understands that the Attorney-General's Department (AGD) and the Department of Finance and Deregulation (DoFD) share primary responsibility for providing guidance to other government agencies regarding IP ownership, indemnities and warranties sought in contracts and grants. At the same time government agencies make their own decisions about financial and grant arrangements.

The *Intellectual Property Principles for Australian Government Agencies*, recently updated *Australian Government Intellectual Property Manual*, and *Finance Circular No. 2009/03* provide some guidance. However, ACIP found that, in practice, some

agencies do not seem to distinguish the provisions sought in procurement from other types of financial arrangements, such as grants and research contracts. While it may be appropriate for government to seek broad provisions in non-research procurement, it may not be appropriate when it is providing grants or entering research contracts to stimulate innovation and IP commercialisation.

ACIP recommends that the Coordination Committee on Innovation (CCI) undertake a range of activities targeted at increasing awareness and implementation of the flexibility currently available to the Commonwealth, including provisions specifically relating to background and project IP licences, warranties, indemnities and moral rights.

Issue 6. Knowledge and IP management in PFROs

According to industry stakeholders, PFROs could be more sophisticated in their dealings with industry in relation to IP identification and management.

Some PFRO stakeholders also felt that having greater clarity and consistency in applying internal IP policies would assist their collaborations with industry.

It was noted that multi-party collaborations, consortia and pooling of IP assets have become more frequent in recent years. These types of arrangements can lead to greater complexity in drafting agreements, managing IP, and assigning responsibilities.

Internal organisational processes, and consistency in following knowledge and IP management policies and procedures, are therefore essential to PFRO collaborations with industry.

The *National Principles for Intellectual Property Management for Publicly Funded Research* (the Principles) give some guidance with regard to protection, ownership, exploitation and management of IP funded by the government and generated by PFROs.

The Principles are currently being reviewed by the CCI. A draft update, titled *Draft National Principles of Intellectual Property Management for Publicly Funded Research Conducted in the Public Sector*, was released for comments in May 2012.

While there have been significant improvements made to the revised Principles, it remains unclear whether they cover all publicly funded research within PFROs or only that resulting from government competitive grant funding.

As well, it is unclear if the Principles aim to provide guidance regarding PFRO activities partially or fully funded by non-government entities.

ACIP is also concerned that the Principles do not provide any guidance to PFROs with regard to their application in practice.

ACIP recommends that the Principles should provide guidance for all types of publicly funded research conducted by public research agencies, not only competitive

grants. ACIP further recommends that mechanisms be developed to encourage PFROs to introduce continual improvement to, and implementation of, their internal policies and procedures for IP management.

Issue 7. De-risking early stage IP

There are several Australian Government programs supporting commercialisation of early stage IP. The Queensland, South Australian and Victorian state governments also provide proof-of-concept grants to PFROs.

Some PFROs stated that they also had internal sources of proof-of-concept funding.

Proof-of-concept funding is necessary to de-risk early stage IP. PFRO stakeholders reported that many venture capitalists and commercial partners take a culling approach to investing in early stage IP. This approach creates a highly competitive market where only IP with a low risk of technological failure may progress through the evaluation pipeline, culling many early stage inventions which PFROs did not get a chance to de-risk.

This issue is more relevant for some sectors than others, and is particularly relevant in biotechnology where IP is often the only commodity being traded.

Some PFRO representatives considered that:

- the available proof-of-concept funds were still insufficient to address PFRO needs
- in some cases, the funds were used as an additional source of internal research funding and not applied to de-risk early stage IP
- in other cases, PFROs were only allowed to engage internal experts in seeking to de-risk early stage IP, even though external expertise may have been more credible or superior.

ACIP considers that determining the adequacy of activities to de-risk early stage IP is an important factor in creating a better environment for PFRO collaborations with industry. The more efficient the de-risking process, the greater the potential for the formation of collaborations. ACIP forwards the above issues in relation to de-risking to DIISRTE for consideration. ACIP is not making a recommendation on how to proceed in dealing with those issues.

Summary of recommendations

While the review aimed to primarily identify how IP acts as an enabler or disabler of knowledge sharing, translational research and collaborations, the Minister noted that it would likely unearth other issues, unrelated to IP, which also affect collaborations. The Minister recommended these issues be referred to DIISRTE for consideration.

On this basis, ACIP refers **Recommendation 2** to IP Australia and DIISRTE.

Also on this basis ACIP asks DIISRTE to consider the other issues identified in this review, specifically those raised in **Recommendations 1, 3, 4, 5 and 6** below.

Recommendation 1: Develop mechanisms to increase the motivation of PFROs, especially universities and medical research institutes (at an institutional level) and PFRO researchers (at an individual level), to engage in collaborations with industry. Considerations should include:

- establishing an evaluation framework that complements ERA (the Excellence in Research for Australia) and measures the impact of PFRO research, including metrics for collaborations with industry
- increasing reward mechanisms for PFROs that are directly linked to PFRO–industry collaboration performance
- increasing the weight given to industry collaboration and engagement activities in appointment and promotion criteria for individual researchers.

Recommendation 2: Encourage the development and promotion of educational resources to assist PFROs, industry and researchers to form and conduct collaborations. Resources should be easily identifiable and accessible to all stakeholders, particularly PFROs and SMEs, and be supported by relevant training. Considerations should include:

- assessing available resources, tools and programs and how they may be best promoted and deployed. Particular focus should be on modules that can assist with:
 - aligning interests with expectations
 - expediting the negotiation of collaboration agreements
 - understanding the commercial/legal provisions in collaboration agreements
- a set of starting principles/questions to help partners focus, communicate and develop a good understanding of the objectives of their collaboration
- term sheet-like smart forms setting out all issues that need to be included in negotiations and possible options to deal with them
- a module focusing on background IP (contributed to a collaboration) and project IP (arising in collaborations), including the proper identification and management of both

- a module on valuation models of early stage technologies and IP
- providing PFROs with access to expert patent analytics services, related business intelligence tools and training.

Recommendation 3: Improve the ability of SMEs and PFROs to form and conduct collaborations with one another. Considerations include:

- programs that increase the awareness of SMEs as to what PFROs have to offer and assistance aimed at encouraging industry to engage with PFROs. These may include innovation vouchers, staff exchange programs and strengthening the Enterprise Connect Researcher in Business program.

Recommendation 4: In order to improve their collaborations with industry, PFROs need to increase their project management skills and capability. Consideration should be given to:

- PFROs allocating additional resources to support project management, and developing and maintaining appropriate skills including through staff exchanges with industry.

Recommendation 5: Request that the Coordination Committee on Innovation (CCI) promote and encourage the use of flexible terms and conditions in Australian Government grants and research contracts, including those specifically related to background and project IP licences, warranties, indemnities and moral rights. Considerations should include:

- collating and communicating information about existing initiatives and previous work undertaken in relation to such terms and conditions and the circumstances in which their flexible application is appropriate
- increasing awareness among Commonwealth and PFRO legal and procurement practitioners of the flexibility available in the terms and conditions of Australian Government grants and research contracts (including those specifically related to background and project IP licences, warranties, indemnities and moral rights)
- establishing a process for government agencies to report on the extent that such flexibility is being applied.

Recommendation 6: Ensure that the *National Principles for Intellectual Property Management for Publicly Funded Research* (currently being reviewed by CCI):

- cover **all** publicly funded research conducted by PFROs
- encourage PFROs to introduce continual improvement to, and implementation of, internal policies and procedures for IP management. Consideration should be given to:
 - including reference to implementing continuous improvement processes in the Commonwealth's mission-based compacts with universities.

1. Collaboration as an engine of innovation

1.1 The links between collaboration and innovation

Today's knowledge-based economy is characterised by an increasing volume of information, the growth of multidisciplinary research and convergent technologies, and increasingly specialised global supply chains.

Collaboration, particularly between the private and public sectors, can be a catalyst for achieving innovation that serves the community and is relevant to the marketplace.

Our desire to integrate better into global research markets coincides with increasing pressure to meet various global challenges. Climate change and demographic change are affecting the globe. They also affect Australia's health system, agriculture, tourism industry, water supplies, coastal settlements, and way of life.

Collaboration across technological and sectoral expertise, and across national borders, increases the probability of finding solutions to these emerging challenges.

In *Powering Ideas: An Innovation Agenda for the 21st Century*¹, the Australian Government states that collaboration builds capacity in Australia, facilitates access to new knowledge, attracts foreign investment, and extends Australia's global influence.

Collaboration also delivers important competitive advantages for Australian businesses as they strive to compete for global markets. According to the *Australian Innovation System Report 2010* many innovating businesses reduce costs and manage risks by collaborating with suppliers, customers, universities and PFROs.²

1.2 Intellectual property in collaborations

For the purposes of this review, intellectual property was defined as

- a) any patent, copyright, trade mark, industrial design, or plant breeder's right that is registered (or subsists) in Australia
- b) any right under the law of a country or territory outside Australia corresponding to, or similar to, a right within a)
- c) any pending application for a right specified within a) or b)
- d) any confidential information not protected by a right within a) or b) or c) but having industrial, commercial or other economic value.

¹ The Commonwealth of Australia, *Powering Ideas: An Innovation Agenda for the 21st Century*, 2009. <<http://www.innovation.gov.au/Innovation/Policy/Documents/PoweringIdeas.pdf>>

² The Commonwealth of Australia, *Australian Innovation System Report 2010*, 61. <<http://www.innovation.gov.au/Innovation/Policy/Documents/AustralianInnovationSystemReview2010.pdf>>

By providing a defined and clear title to intellectual assets, IP rights play a role in facilitating collaborations, knowledge transfer and technology exchange. By giving the owner the right to stop other parties from using their protected knowledge or ideas, IP rights can assist businesses to recoup the costs of investment in innovation, as well as give them the confidence to make that knowledge and those ideas available for further development.

IP rights enable innovators to exclusively exploit their innovations for a specified time. In the case of patents, the protection period is 20 years, or potentially 25 years for pharmaceuticals.

Granting of a patent is conditional upon comprehensive public disclosure of the working of the invention. Innovators can use patent databases to build on and enhance previous inventions, as well as to identify potential partners in the field they are working on.

The Intellectual Property Research Institute of Australia (IPRIA) estimates that patent rights increase the probability that an invention will be commercialised by thirteen percentage points.³ Without such an incentive, many innovations may never translate into the new technologies, products and services that benefit society.

Confronted with increasing competition, rising costs and the growing convergence of technologies, some businesses collaborate with external partners, with their suppliers, customers or PFROs, including universities. Such collaborations help them stay abreast of developments, expand their market reach, tap into a larger base of ideas and technology, access specific skills and competencies, and get new products or services to market before their competitors. For many of these businesses, IP rights can be crucial to realising value from their collaborations.

PFROs also seek to maximise the value of their resources—including their IP rights—through collaborations with industry. These collaborations help stimulate translation of public research into new technologies, products or services. International evidence based on patent data supports this: up to three-quarters of private sector patents draw on public sector research.⁴ IP rights may also affect collaborations and knowledge sharing among researchers, primarily through academic publications.

The commercialisation of IP created by PFROs is, however, only one example of their engagement with industry and the broader community. Interactions and relationships are often formed on the basis of informal personal contacts and through networks, by academics looking for funding for a research opportunity, or by companies or their agents looking for solutions to a problem relevant to their business.

³ Webster E & Jensen PH. Do patents matter for commercialization?, *Journal of Law and Economics*, 54, 2011, 431–453.

⁴ *Powering Ideas*, 32.

1.3 Background to the review

The Australian Government’s innovation agenda over the next decade—*Powering Ideas: An Innovation Agenda for the 21st Century*—has established a vigorous evidence-based reform program.

A key objective is to increase the level of collaboration by 2020.⁵ Two out of seven National Innovation Priorities are aimed at fostering the level of collaboration within the Australian innovation system, namely:

- **Priority 5:** The innovation system encourages a culture of collaboration within the research sector and between researchers and industry
- **Priority 6:** Australian researchers and businesses are involved in more international collaborations on research and development.

ABS data⁶ clearly indicate that collaboration can improve business performance (Refer to Figure 1).

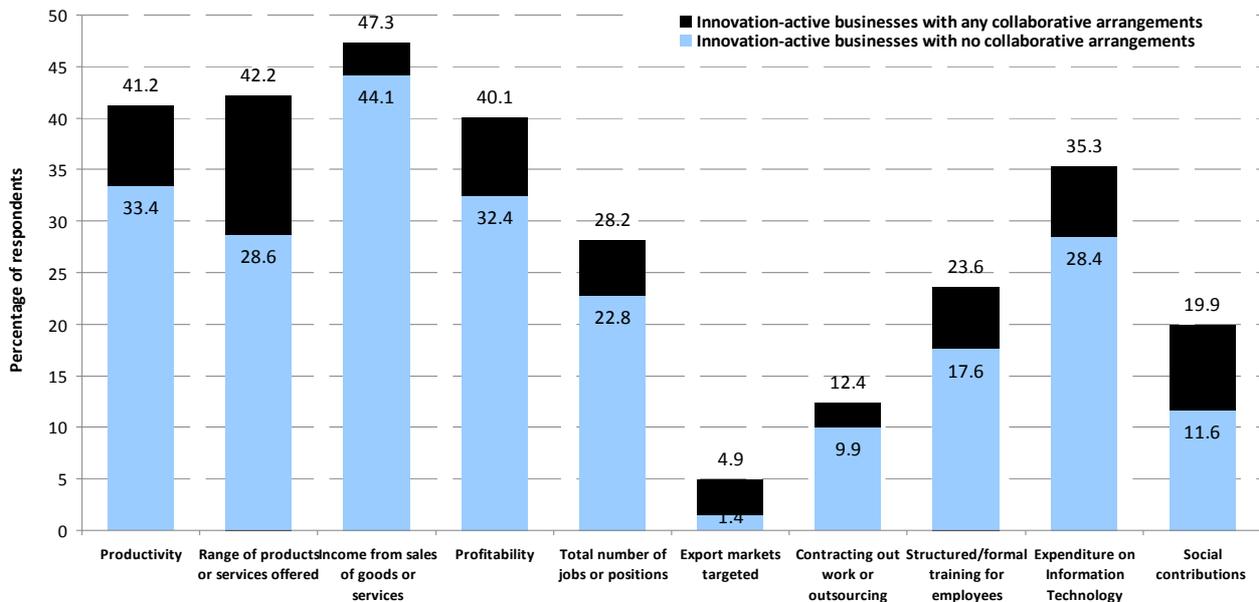


Figure 1: Business performance across a range of indicators comparing innovation-active businesses that do collaborate with those that do not collaborate.

ABS data also indicates that, overall, the level of collaboration between innovation-active businesses and PFROs is low. Figure 2 shows that in 2008-09 (latest available data), only 2.4 per cent of innovation-active businesses collaborated with universities, while 4.4 per cent of such businesses collaborated with PFROs in Australia.⁷

⁵ *id.*

⁶ Source: Australian Bureau of Statistics (2012) Data analysis commissioned by DIISRTE from the Business Characteristics Survey, 2009-10

⁷ 2011 Australian Innovation System Report, 62.

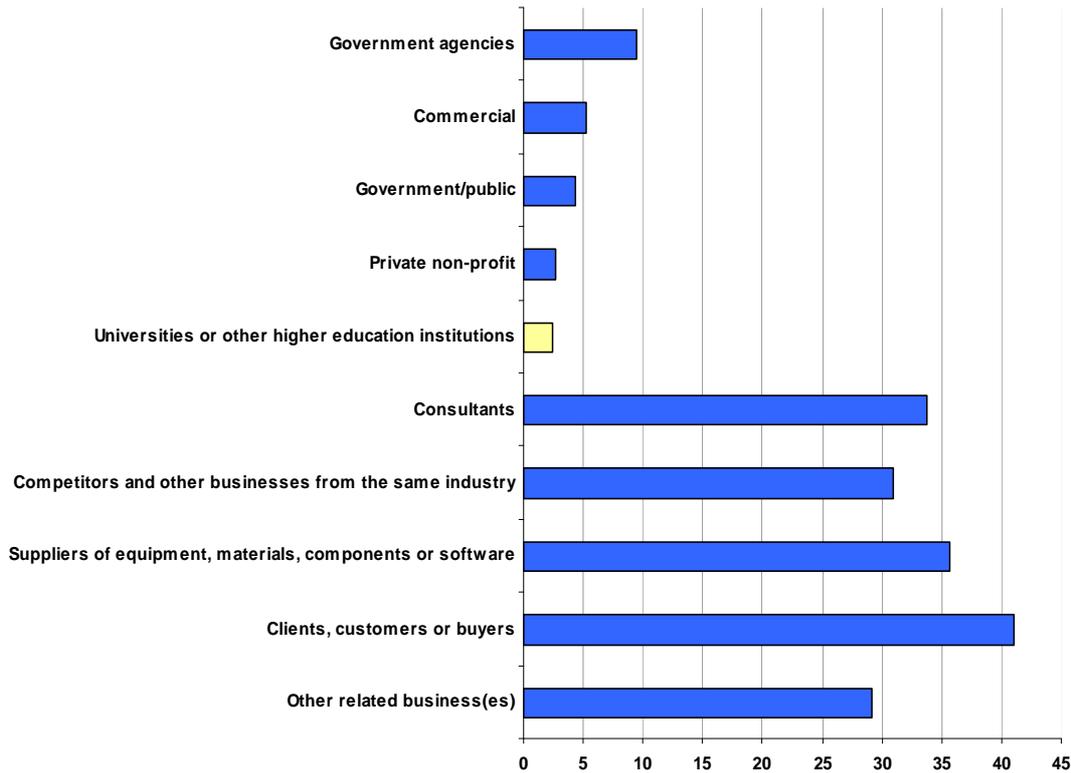


Figure 2: Collaboration by innovation-active businesses within Australia, by type of organisation collaborated with (Source: ABS (2010) Innovation in Australian Business, 2008-09)

However, this aggregate picture varies significantly between industry sectors⁸ and by firm size. For example, 32% of large firms in the health care and social assistance sector collaborate with the research sector. Similarly high numbers (10-30%) are seen for large mining businesses. Research undertaken by the Melbourne Institute in 2010 concluded that SMEs in the manufacturing industry have the highest probability of engaging in innovative activities with the research sector.⁹

Whilst acknowledging that there are variations across sectors, it is safe to surmise that Australia is potentially missing out on benefits through the comparatively low level of knowledge transfer from the public to the private sector.

1.4 Scope of the investigation

In conducting this review, ACIP recognised that collaborations between PFROs and private sector stakeholders take many forms, involve multiple stakeholders and cover different issues, many of them being transactional issues rather than issues directly related to the substance of what constitutes the IP system.

⁸ 2010 Australian Innovation System Report, p21, Original Source: ABS (2008), *Innovation in Australian Business, 2006-07*, cat. no. 8158.0.

⁹ Palangkaraya A, Stierwald A, Webster E & Jensen PH. (2010) *Examining the Characteristics of Innovative Firms in Australia*. Melbourne Institute of Applied Economic and Social Research, 5-6.

ACIP also recognised that the IP system is only a sub-set of the innovation system, and that the review draws on the links between IP and innovation.

1.5 The review process

1.5.1 Industry participation

In November 2010 ACIP published its *Call for Industry Submissions*,¹⁰ along with an online submission form, seeking written comments from industry stakeholders regarding their experiences of collaborations with PFRs. Thirty-one written responses were received, including from SMEs (46 per cent)¹¹, large R&D companies (35 per cent), industry associations (13 per cent) and other industry stakeholders (6 per cent).

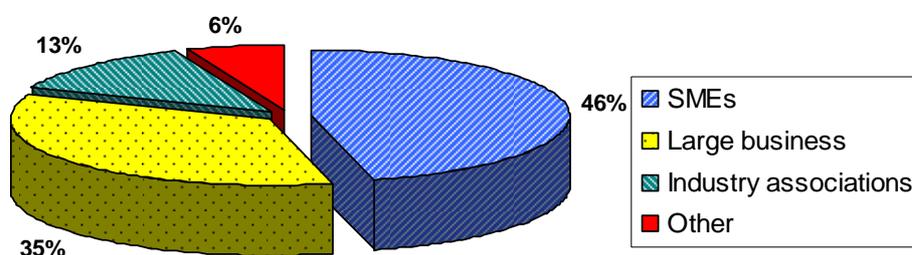


Figure 3: Industry submissions received by the type of respondent

From December 2010 to March 2011, ACIP held industry roundtables in Perth, Melbourne, Brisbane, Adelaide and Sydney. The discussions further explored the issues raised in online submissions. Forty-six industry representatives attended these roundtables (listed in Appendix C).

1.5.2 PFRo participation

PFRo submissions were called for in August 2011, and closed in December 2011. ACIP received thirty-three written submissions (listed in Appendix B). Respondents comprised those working in technology transfer offices (37 per cent), executive management (26 per cent), various research departments and centres (19 per cent), industry engagement offices (11 per cent) and legal offices (7 per cent).

¹⁰ <http://www.acip.gov.au/library/call_for_submissions_private.pdf>

¹¹ SME is defined as any organisation having less than 200 employees and/or having an annual turnover of less than \$10 million.

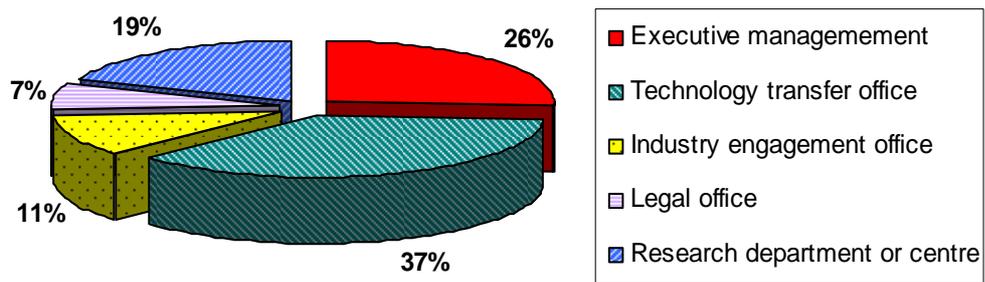


Figure 4: PFRO submissions received by the type of respondent

PFRO roundtable discussions were held in five capital cities. They attracted a cross-section of stakeholders from Australian universities, public research agencies, medical research institutes and collaborative research centres. Fifty-five representatives participated (listed in Appendix D) and provided additional input to the ACIP Working Group.

1.5.3 Consultations with other stakeholders

As part of the consultation process, ACIP also met with the CEOs of the Australian Research Council and the National Health and Medical Research Council.

Meetings were also held with senior representatives from the Department of Finance and Deregulation, Attorney-General's Department and the Commonwealth Scientific and Industrial Research Organisation.

2. The changing dynamics of collaborations between industry and Australian PFROs

2.1 Defining collaborations

For the purposes of this ACIP review:

Collaboration involves activities where two or more parties work together and each contributes resources, such as intellectual property, knowledge, money, personnel or equipment, to address a shared objective, with a view to obtaining a mutual benefit.

While contract research and staff consultancies are frequent types of engagement between industry and PFROs, ACIP investigated whether they should be included in the definition of collaboration.

A material number of industry and PFRO representatives considered these forms of engagement were collaborations. Their experience indicates that contract research and staff consultancies can involve knowledge exchange between the parties. Moreover, these types of PFRO–industry engagements also assist the partners to develop relationships and build trust, thus potentially seeding broader scale collaborations in the future.

It was suggested that contract research and consultancies should be regarded as collaborations and hence included in the statistics used to report the national collaboration performance.

The collection of the data used to measure the level of collaborations is guided by the *Oslo Manual – Guidelines for Collecting and Interpreting Innovation Data*, developed and regularly updated by the OECD.¹² The manual does not exclude contract research and consultancies, provided that ‘all parties take an active part in the work’ and that it is not ‘pure contracting out of work’.¹³ The Australian Bureau of Statistics (ABS) uses data from its Business Characteristics Survey¹⁴ to report collaboration statistics to the OECD. The survey draws on the definitions from the Oslo Manual as it collects data on collaboration. It refers to collaboration as

Participation in joint projects with other businesses or organisations. Each participant does not need to benefit commercially. Collaborations explicitly exclude straight fee-for-service and franchise arrangements, but include informal arrangements.¹⁵

¹² Organisation for Economic Co-operation and Development, 2010, *Oslo Manual – Guidelines for Collecting and Interpreting Innovation Data*, 2010.

¹³ The Oslo Manual, 271.

¹⁴ The Business Characteristics Survey is conducted annually. Included are questions relating to types of collaborative arrangements, barriers to innovation, and key indicators of innovation (type and status). These questions are asked of all business. These data are released annually in [Summary of IT Use and Innovation in Australian Business](#) (cat. no. 8166.0) and [Selected Characteristics of Australian Business](#) (cat. no. 8167.0).

¹⁵ The Oslo Manual, 271.

ACIP therefore concludes that contract research and consultancies—those involving an active exchange of knowledge, and not just a fee-for-service arrangement—are already counted as collaborations within responses to relevant questions in the Business Characteristics Survey.¹⁶

2.2 Frequency of collaborations between PFROs and industry

Australian PFROs seek to participate in collaborations with industry. All PFRO respondents stated that they have entered into at least one collaboration with industry in the past five years. Seventy-six per cent stated they have entered into more than 20 collaborations, as shown in Figure 5.

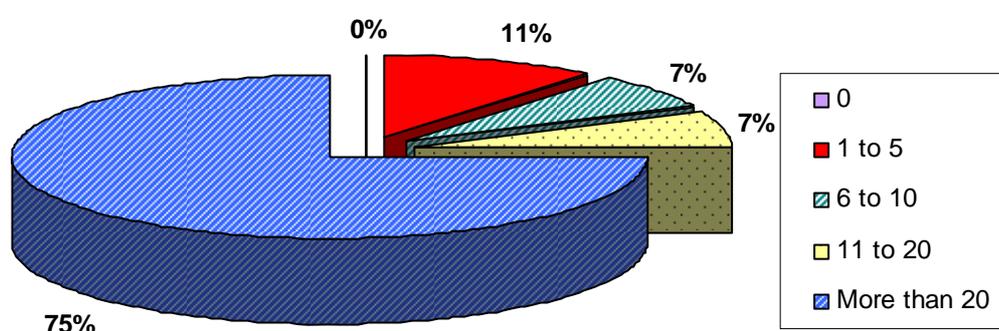


Figure 5: Number of PFRO consultations with industry over the past five years

At an institutional level, the importance of collaborations with industry is acknowledged in PFROs' strategic missions or plans. Seventy per cent of PFRO respondents stated their institutions had written strategies for collaborating with industry. Such institutional strategies, however, do not seem to be actively promoted. PFRO staff working outside technology transfer and industry engagement offices may not be aware of these strategies.

Australian PFROs are sometimes seen as having a strong preference for collaborations with larger organisations, and as not being interested in collaborating with smaller ones. Industry partners made similar statements; that PFROs tend to target large business, while projects with SMEs are typically on a smaller scale. SMEs stated they either find it difficult to generate interest from within PFROs' commercialisation and technology transfer offices (TTOs), or do not know who to contact within PFROs for assistance with enquiries.

Some respondents suggested that the PFRO technology transfer function could potentially be more centralised. However, they also pointed out that this should only involve technology transfer and IP out-licensing. Consultancy, contract and

¹⁶ ABS testing has shown that organisations involved in collaborative arrangements are able to interpret the questions appropriately and report correctly.

collaborative research were the types of collaborations some respondents felt were better managed by individual PFROs themselves.

2.3 Types of collaborations

Collaborations involving industry and PFROs take many forms. They can be direct or indirect, ephemeral and related to one-off projects, strategic and long term, bilateral or multilateral,¹⁷ such is the typical case of the Cooperative Research Centres.

Industry engages in a range of collaborative activities with Australian PFROs. These include:

- ARC Linkage Grants, Centre of Excellence grants and NHRMC grants
- various research and development collaborations, including joint ventures involving federal and state funding
- commissioned or contract research (fee-for-service)
- consultancy projects
- participation in Collaborative Research Centres
- licensing or assignment of IP developed by PFROs
- transfer of materials (especially biological materials)
- clinical trials and various testing service agreements
- joint publications
- industry sponsorship of university students, especially PhD students
- student internships and training programs with industry
- stakeholder steering groups
- equipment and facility hire.

Collaborations with PFROs assist industry to realise the full value of their internal R&D projects. PFRO inventions, research outcomes and staff present a reservoir of intellectual capital for industry to tap into. Industry demand for PFRO expertise in solving problems and testing hypotheses seems to be a frequent trigger for industry collaborations with Australian PFROs.

2.4 Benefits of collaborations

2.4.1 Benefits accruing to industry

Collaborations with PFROs typically bring both direct and indirect benefits to industry partners. The key benefits reported during consultations included indirect benefits, such as:

¹⁷ Submission 47.

- knowledge flows, mutual learning and helping industry find new ways of applying their internal resources and R&D
- identifying prospective employees from the student cohort
- networking and relationship building between researchers working within PFROs and industry, including researchers working for competitors
- joint branding of research projects with PFROs often helps companies to access government grants and to position themselves as leaders in their research field
- availability and expertise of PFRO personnel, access to facilities and other infrastructure necessary to collaborate.

Additionally, the process of learning that an intended research outcome **cannot** be achieved was often viewed as an important outcome by industry.

The development of new technologies, IP and knowledge feeding into internal R&D programs pursued by industry was identified as a direct benefit resulting from collaborations.

2.4.2 Benefits of collaborations accruing to PFROs

PFROs identified collaborations with industry as bringing direct monetary returns. This was identified as a major motivation. The returns took many forms, including:

- full-time equivalent support for collaboration research
- royalties, option, licence and milestone fees
- support for IP protection and management
- contributions to overheads
- full or partial funding of student scholarships, infrastructure and selected PFRO operations
- sponsorships of academic staff and prizes for research excellence.

PFROs in general, and universities in particular, stated they typically used revenue received from industry to support research activities. That revenue also appeared to be the measure PFROs often used to report the level of their collaborations.

In addition to direct financial benefits, collaborations with industry were reported to bring significant intangible benefits to PFRO researchers and their institutions. Perhaps the most valuable being an increased reputation in the community, which translates into increased student enrolments and attracts good researchers.

PFROs also stated their relationships with industry partners provided insights that helped direct research and teaching programs as well as promoting further engagement with the broader community.

Finally, collaborations with industry were also reported as enabling researchers and students to engage in real-life problems and helping them find employment after graduation. *The Researchers in Business Scheme* was highlighted, on several occasions, as an excellent example of an Australian Government program leading to increased PFRO engagements with industry.

Researchers in Business Program

Through its Enterprise Connect *Researchers in Business* initiative, the Australian Government supports the placement of researchers from universities or public research agencies into firms that wish to develop new ideas with commercial potential.

The aim of the scheme is to help researchers and universities strengthen industry engagement and provide opportunities for early career researchers and/or postgraduate students nearing completion of their degrees. The scheme also allows them to expand their expertise and spend significant time with industry to develop strategic relationships.

Funding for up to 50 per cent of salary costs, to a maximum of \$50 000, can be provided to eligible applicants. Placements can be for periods of two to 12 months. Grants are available all year round and are entitlement based, not competitive in nature.

For more information about the scheme visit the [Enterprise Connect](http://www.enterpriseconnect.gov.au) website: <http://www.enterpriseconnect.gov.au> or phone Enterprise Connect on 131 791.

2.5 Level of satisfaction with collaborations

Industry partners expressed satisfaction with the outcomes of collaborations with Australian PFROs. Fifty-four per cent who collaborated over the past five years stated they were satisfied or extremely satisfied, as shown in Figure 6. Similarly, the majority (70 per cent +) of roundtable participants viewed collaborations as successful.

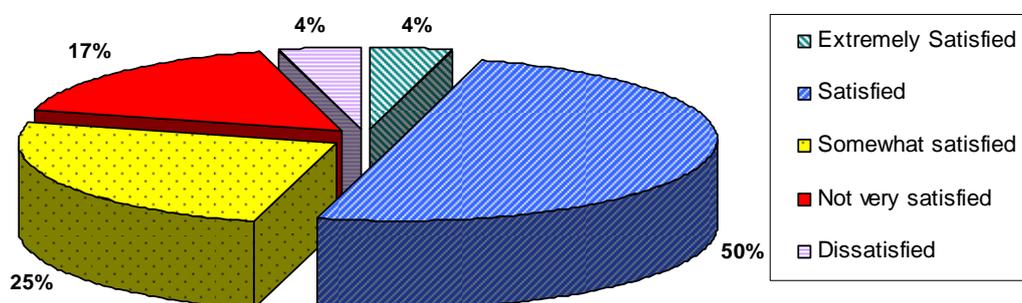


Figure 6: The level of industry satisfaction with outcomes of collaborations with Australian PFROs

Overall, PFROs also expressed satisfaction. However, measuring the success of PFRO collaborations with industry does not appear to be an established practice.

Most PFROs stated they did not have formal mechanisms in place for seeking feedback on performance. Debriefings, phone calls and formal evaluations were less common than in industry.

Some PFRO stakeholders surmised that the development of metrics measuring the impact of PFRO research would also drive the establishment of evaluation mechanisms for collaborations (see also Performance metrics and rewards in Chapter 3).

2.6 The role of intellectual property in collaborations

Collaborative research projects were reported as typically involving the contribution of various types of IP, including patents, industrial designs, trade marks, copyrights and confidential information.

Depending on the nature of collaborations, all types of IP were identified as playing important roles, both as inputs and outputs.

Industry stakeholders across all sectors acknowledged that IP issues are complex and vary from collaboration to collaboration. Expert assistance from legal, business and scientific personnel is required in negotiating and implementing agreements.

It was noted, both in written submissions and roundtable discussions, that it is crucial to deal with all commercial terms and IP principles upfront, at the negotiation stage. Industry and PFRO respondents unanimously stated that if agreement on these could not be reached, then it was not worth proceeding.

Both groups also identified IP as an important, and depending on the circumstances, critical consideration and motivation in forming collaborations. It was noted that IP:

- attracts industry partners to work cooperatively with PFROs
- assists in obtaining additional research revenue for PFROs
- helps to transfer knowledge to industry and translate research outcomes into improved practices, products and services (some PFROs consider these to be the indicators of the impact of their research).

At the same time, industry pointed out that IP cannot be looked at in isolation. Other considerations are also important, including the availability and expertise of PFRO personnel and access to the facilities and other infrastructure necessary to benefit from the collaboration.

In some instances, particularly where speed to market was crucial, IP was viewed as irrelevant, depending on the purpose of the collaboration and type of industry in which it took place. In other instances, stakeholders felt that negotiation of the broader commercial terms presented difficulties and was a potential disabler.

Some university respondents suggested that the most valuable piece of IP owned by any university was its brand. Universities stated they carefully manage their brand, including as part of their web presence and when establishing new entities.

2.6.1 References to IP in submissions

Interestingly, many stakeholders, especially in industry, initially referred to IP issues as everything from reaching an agreement on the terms of a collaboration, or differences in contracting policies within PFROs, to a lack of sophistication and knowledge of commercial realities.

When questioned, it was recognised that stakeholders were using IP as a catch-all term to describe problems associated with many of the commercial terms arising in negotiations. One interesting example of the broad use of 'IP issues' appears in the following industry submission:

We experience extremely high costs associated with reaching agreement with PFROs. Each organisation has a different contracting approach, with different contracting templates and different contracting policies. The skills and experiences of individuals in these organisations vary greatly, significantly impacting the speed at which progress can be made. This is compounded by the unrealistic value PFROs place on their IP. Their ambit claims always include large up front license fees and unrealistic royalties potentially draining the resources needed to develop, market and sell the technology. Many of the commercialisation officers we engage with have no industry experience and are researchers that have transitioned to commercialisation. They are unfamiliar with the commercial realities and their approach to negotiations is adversarial. This does not foster the open, transparent and trusting environment needed for long term relationships. Often PFROs seek to own arising IP although full commercial rates are paid as consideration for any work undertaken. PFROs also seek to segment the market by restricting commercialisation rights thereby reducing the commercial gains and increasing commercial risks. PFROs will not provide an indemnity against infringement of third party IP. In one case this caused a significant delay in reaching an agreement.¹⁸

In addition to the general issues described above, the ACIP inquiry identified several specific issues affecting the formation and success of collaborations. These issues are canvassed in the following three chapters.

¹⁸ Submission 30.

3. Key issues affecting the formation and success of collaborations

3.1 Performance indicators and rewards for PFROs

There was a high level of agreement among PFRO and industry stakeholders that the current performance metrics for PFROs in general, and universities in particular, were not well geared toward forming collaborations with industry. Three concerns were highlighted.

The first concern was that current performance metrics for universities (*Excellence in Research for Australia*, or ERA) focused on quantitative outcomes of PFRO research, such as the volume of publications, and the value of research grants received from institutions such as ARC and NHMRC. ERA did not measure the impact of university research, including collaborations. Hence incentives for universities may not be sufficient to motivate them to engage with industry. It was suggested that the drivers of PFRO funding need rebalancing, as the external funding rules have a significant influence on their behaviour and allocation of resources.

Most industry and PFRO stakeholders proposed that PFRO performance metrics should be directly linked to funding. They suggested that a new evaluation framework should be established to complement ERA, and that it should include KPIs focusing on the impact of PFRO research.

The second concern raised by industry was that PFROs across Australia had different measures for collaboration performance, if any. Some surmised that the development of consistent measures would assist PFROs with the selection of collaborative projects.

The third concern was that many PFRO stakeholders felt that the reward structure did not encourage them to get involved in collaborations. Early career academics, in particular, need to focus on publishing and securing ARC and NHMRC grants—achievements that have the greatest impact on their career advancement.

ACIP considers that the issue of motivation and rewards for PFROs (at an institutional level) and PFRO researchers (at an individual level) is a key structural impediment to optimal formation of collaborations with industry.

By increasing motivations and incentives for PFROs to engage in collaborations, PFROs would place more focus on them and allocate more resources. This might also help address the following issues identified in consultations:

- increasing the level of PFRO engagement with industry
- aligning interests and expectations from collaborations
- resourcing collaborations in PFROs
- IP management in PFROs

- Project management in PFROs.

Accordingly, ACIP recommends that DIISRTE considers developing mechanisms to increase the motivation of PFROs and their researchers to improve the level of engagement with industry.

Recommendation 1: Develop mechanisms to increase the motivation of PFROs, especially universities and medical research institutes (at an institutional level) and PFRO researchers (at an individual level), to engage in collaborations with industry. Considerations should include:

- establishing an evaluation framework that complements ERA (the Excellence in Research for Australia) and measures the impact of PFRO research, including metrics for collaborations with industry
- increasing reward mechanisms for PFROs that are directly linked to PFRO–industry collaboration performance
- increasing the weight given to industry collaboration and engagement activities in appointment and promotion criteria for individual researchers.

In putting forward this recommendation, ACIP notes that the *Focusing Australia's Publicly Funded Research* review¹⁹ recommended a feasibility study be undertaken on possible approaches for developing a rigorous, transparent, system-wide Australian research impact assessment mechanism.

Several initiatives aimed at developing or refining performance metrics for PFROs are currently being pursued by the Australian Government. These include:

- the Research Division at DIISRTE is undertaking a feasibility study on how to develop a rigorous, transparent, system-wide research impact assessment mechanism, separate from ERA. The study is expected to be completed by early 2013
- establishing an inter-departmental committee chaired by the Chief Scientist of Australia tasked to develop a national research investment plan to cover the full range of activities, including collaborations. The committee was established in November 2011.

ACIP also notes that the Australian Technology Network (ATN) group of universities, four of the Group of Eight (Go8) universities, and three non-aligned universities announced last year that they would be undertaking a joint trial exercise in 2012 to assess the impact of research produced by the Australian university sector. The trial will be undertaken in the second half of 2012, and comprise 12 participating universities. It is the intention of the ATN and the Go8 that this initiative will be a

¹⁹ <<http://www.innovation.gov.au/Research/Pages/FocusingAustraliasPubliclyFundedResearch.aspx>>

significant step forward in developing the ability to assess the impact of research produced by universities.

3.2 Collaborations with SMEs are more problematic

SMEs are an important part of Australia’s innovation system. They form a large majority of Australian businesses (96 per cent), generate at least 33 per cent of GDP and employ over five million Australians, or 63 per cent of all workers.²⁰ At the same time it needs to be recognised that the SME sector is not homogenous and there are differences between its various sub-sectors.

Despite these sub-sectoral differences, ACIP’s consultations identified a number of issues which SMEs face in their attempts to collaborate with PFROs. These include:

- **Limited financial resources:** SMEs do not have the financial resources to be considered attractive as potential collaborators for PFROs when compared to large businesses, and the transaction costs can be high relative to SMEs’ financial resources
- **Availability of internal expertise and resources:** SMEs may lack internal expertise or lack knowledge or resources to hire external experts
- **Awareness:** many SMEs seem to lack knowledge of what PFROs have to offer or are unable to locate expertise within PFROs.

These issues are not unique to Australia. Collaborations between SMEs and PFROs are problematic in most OECD countries. Figure 7 below shows the percentage of

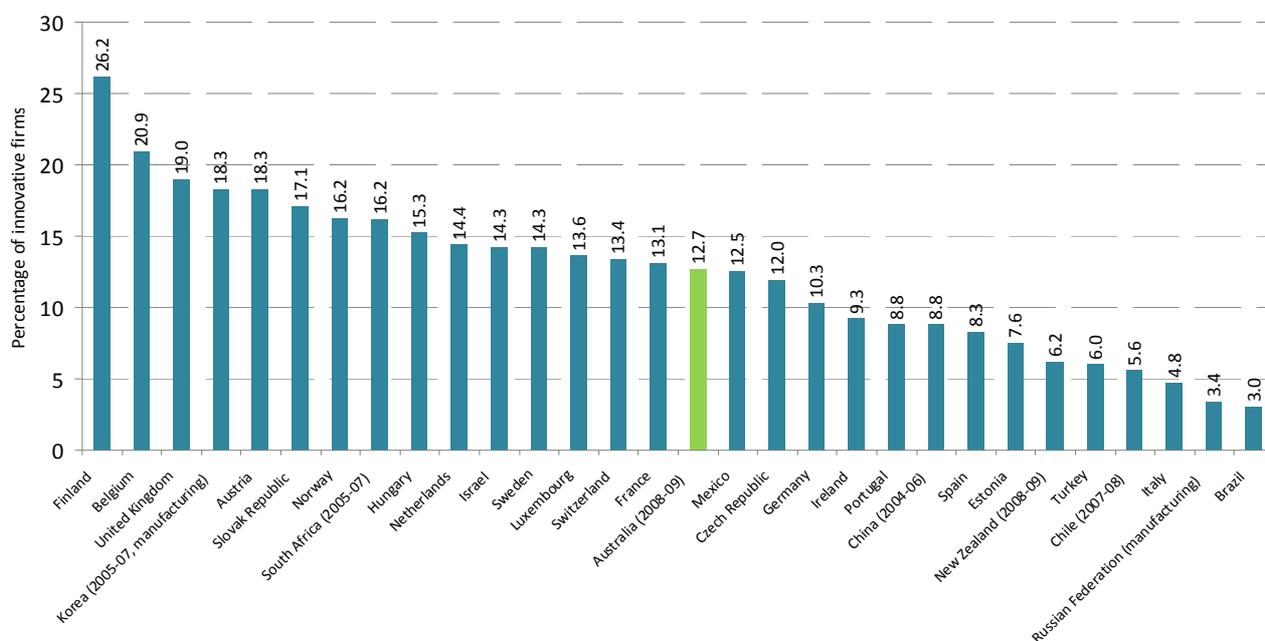


Figure 7: SMEs collaborating on innovation with higher education or government research institutions. Data source: *OECD Science, Technology and Industry Scoreboard 2011*, OECD Publishing Data for Australia: ABS Business Characteristics Survey, special request.

²⁰ Source: The Australian Bureau of Statistics.

innovation-active SMEs collaborating on innovation with higher education or government research across a range of OECD countries over a two year reference period covering 2006-08.

The low absolute value for Australian SMEs (12.7 per cent) is consistent with that for OECD countries overall (12.3 per cent).

Recognising that collaboration is a key to improved innovation performance, many OECD countries have introduced innovative policy instruments to encourage collaboration with the SME sector. One, the innovation voucher scheme, is now operating in 20 EU countries.

Some Australian state and territory governments have also introduced programs and initiatives incorporating elements of the voucher system. These include *Tech Vouchers* (NSW), *Innovation Vouchers* (Qld, WA), *Small Technologies Industry Uptake Program* (VIC), *E-government Technology Cluster* (ACT) and *Collaborative Solutions Program* (NSW).

While the impact of these initiatives is yet to be seen, ACIP is of the view that there is an **information failure** represented by SMEs' lack of access to PFRO knowledge bases, and that increasing the level of collaborations between SMEs and PFROs has the potential to increase knowledge transfer and positively affect Australia's productivity.

Recommendation 3: Improve the ability of SMEs and PFROs to form and conduct collaborations with one another. Considerations include:

- programs that increase the awareness of SMEs as to what PFROs have to offer and assistance aimed at encouraging industry to engage with PFROs. These may include innovation vouchers, staff exchange programs and strengthening the Enterprise Connect Researcher in Business program.

3.3 Aligning interests and expectations

PFROs and industry have different missions that also underpin expectations from collaborations. The differences were exemplified in one PFRO submission as follows:

Collaboration evokes a sense of shared endeavour and it is this that ultimately results in a successful project. However, it is not a collaboration if one party begins negotiations with a perspective that its contribution, be it money, resources or intellectual endeavour is more valuable than the other party's and therefore is entitled to dictate terms. A true collaboration is one where there is a meeting of minds and a shared belief that working together will result in a better outcome.

PFROs and industry could work together better in collaborations if they each better understand the position of the other. It would be helpful if industry understood the unique position of PFROs as public institutions and that:

- academic researchers must publish in order to achieve career progression and therefore must be allowed to publish in most instances
- PFROs bring a wealth of background IP and know-how to a project which should be recognised
- academic researchers need to be able to continue their line of research after any individual project is completed.²¹

Several industry and PFRO stakeholders pointed out that alignment of the different interests, expectations and objectives of parties was the key to a successful collaboration. It is critical that alignment occurs at the outset, and at three levels:

- the alignment of different missions and expectations between the PFRO and the industry partner
- the alignment of different input and output expectations of the PFRO and the industry partner
- the alignment of different perspectives and expectations of internal staff.

These differences are explored in the following sections.

3.3.1 Different organisational missions

PFROs and industry have substantially different missions.

PFROs such as universities teach and conduct research. PFROs such as CSIRO principally conduct research and seek to make the results of that research available to industry. Some PFROs supplement public sources of funding with non-public funding, including from philanthropy. PFROs' application of their resources, including IP, is therefore principally geared toward fulfilment of these objectives.

For industry, their resources, including IP, typically establish a legal basis for providing the company with a sustainable competitive advantage to be profitable.

The different drivers can make it difficult for PFROs and industry to understand each other's positions in negotiating collaborations and also affect the time required to finalise negotiations.

Australian PFROs, including universities, increasingly view collaborations with industry as not only supplementing their education and research functions, but also as supplementing their sources of funding.

²¹ Submission 64.

Many industry stakeholders expressed the view that some Australian PFROs have in recent years significantly changed their internal culture and approaches to show a more favourable disposition to collaborations with industry.

Notwithstanding these positive developments, there appears to be considerable scope for improvement.

The major concerns expressed by industry with regard to PFRO involvement in collaborations centred on two areas:

- a lack of understanding by some PFROs of the time, effort and significant resources required to convert early stage IP and technologies into goods or services for sale in the marketplace
- with exceptions, a generally low level of sophistication of PFRO staff dealing with industry.

Industry made the point that the success of negotiating and implementing collaborations often came down to the people involved, the relationship they established, and the trust that is built. However, good relationships and established trust occur on an ad hoc, rather than a systemic basis.

Some PFRO stakeholders pointed out that some industry partners:

- did not provide enough feedback to PFROs
- lacked understanding of PFRO needs and core functions, e.g. their need to publish the results of research.

However, they highlighted that there are multiple examples of successful collaborations but unfortunately these are not readily available to be shared between PFROs and between PFROs and industry.

It was generally suggested that PFROs and industry would each benefit from gaining a better understanding of the each other's perspective.

3.3.2 Different perspectives and expectations of internal staff

Many respondents pointed out that there was often a disparity of views between the technical (researchers), and the legal, business and management personnel involved in collaboration, both within PFROs and industry.

Researchers, business managers, lawyers and the person having ultimate sign-off on a transaction typically have different perspectives on collaborations, often work in independent silos and may fail to appreciate other viewpoints and contributions. For example, researchers tend to look at best case scenarios while lawyers tend to look at worst case scenarios.

One option proposed by some industry stakeholders to overcome this disparity was to have industry-experienced business managers as intermediaries. It was suggested that

lawyers could be more effective as advisers to business managers rather than dealing directly with researchers. This solution works for some organisations, yet it is still dependent on the experience and skills of individual business managers, and therefore, may not address a potential disconnect between researchers and business managers where that experience and skill is lacking.

Another option, suggested by a consultant who has acted for both sides, was to ensure that everyone knew and understood each other's roles. This would require a systemic education program on each side, and engaging senior business managers with significant industry experience. It would likely be impractical for many SMEs.

PFRO representatives reported that researcher communication was often instrumental in initiating collaborations with industry. At times PFRO researchers also set expectations concerning commercial terms, even though they did not have the authority, which typically rests with PFRO technology transfer or research offices. This causes problems later in the negotiation process when the actual commercial terms are made known to industry.

TTO representatives stated that they regularly had to fix problems resulting from promises and encumbrances made by researchers prior to them receiving details of the proposed deal. Additionally, it was reported that TTOs were at times given little time to assess and protect IP before disclosure was made by researchers.

Conversely, some PFRO researchers stated there can be internal tension between a university's Research Office (typically responsible for the execution of contract research and consultancies) and the university's Technology Transfer Office (managing IP development, collaboration and licensing). The lines of communication between these two offices or their functions may not be well defined, clearly articulated or strictly adhered to. This was also identified as having a potential adverse impact on the process of establishing collaborations with industry.

3.3.3 Understanding and aligning interests and expectations

Several stakeholders highlighted that understanding and alignment of the different interests, expectations and objectives between potential parties was the key to a successful collaboration.

The experiences of those consulted suggested that the development of a starting set of principles on collaborating with other organisations has been very helpful. These principles included:

- internal strategies and policies facilitating the development of understanding within an organisation of the purpose of collaborations and the role of those managing them, including researchers, business managers, lawyers and persons with ultimate sign-off authority
- an agreed term sheet that sets out the commercial terms of the deal, particularly for large collaborations

- a clear identification of an agreed set of IP principles to be used in the collaboration.

ACIP recommends that such tools be developed and included in educational resources to assist PFROs, industry and researchers to align interests and expectations from collaborations.

It is further recommended the PFRO sector and industry (taking into account the special needs of SMEs) be encouraged—either separately, jointly or by engaging third parties—to develop educational resources for best practice in creating and managing collaborations in Australia.

Identified best practices should be made known, in the most effective ways possible, to all who engage in collaborations involving PFROs and industry (see also Recommendation 2).

3.4 De-risking early stage IP

Some PFRO representatives considered that a significant impediment to increased collaborations with industry is the lack of funding to de-risk early stage IP discovered by their researchers and turn it into market-ready technology.

PFRO inventions are generally at an early stage of development and further research and proof-of-concept validation studies are required to bring the invention to a stage where it is ready to be licensed to industry. Proof-of-concept funding can help to bridge the gap.

There are several Australian Government programs that support the commercialisation of early stage IP. A summary of major programs, some of which support commercialisation, is provided at Appendix E.

The Queensland, South Australian and Victorian state governments also provide proof-of-concept grants to PFROs.

PFRO stakeholders stated that many venture capitalists and commercial partners take a culling approach to investing in early stage IP. This approach creates a highly competitive market where only IP with a lower risk of technological failure may progress through the evaluation pipeline, culling many promising early-stage inventions which PFRO did not get a chance to de-risk.

The risks associated with early stage IP were stated to be significant as translating early stage IP into market-ready products requires substantial time and resources. Furthermore, these risks often coincide with the stage where government support tapers off, creating a risk gap that is known as the Valley of Death.

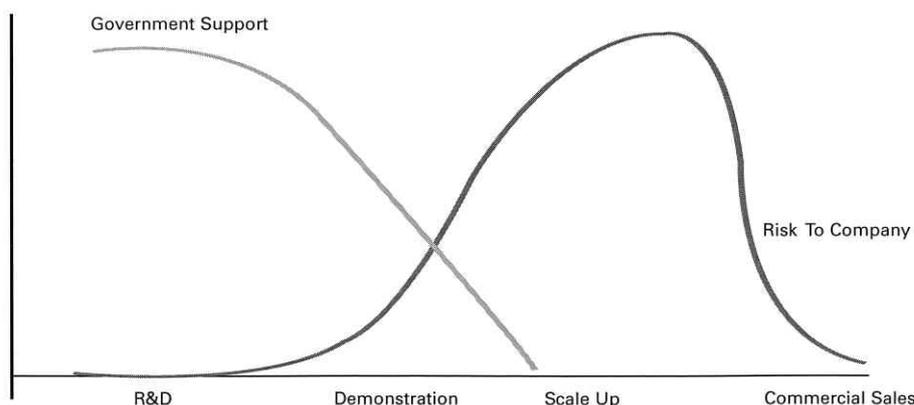


Figure 8: The Valley of Death (Source: OECD)

While some PFROs have introduced internal proof-of-concept funds in recent years, ACIP’s consultations identified that some PFROs were unable to use the funds to engage external consultants to further develop the early stage IP. Other PFROs tend to rely on their internal scientific teams to undertake further validation and development studies. Industry stakeholders reported, however, that it is often beyond the capability of those internal teams to provide credible answers to key questions posed by potential industry partners.

Some PFRO representatives argued that available government funding does not cover the whole spectrum of the commercialisation process, or that the funding is insufficient.

In particular, some PFROs argued that while existing funding opportunities might support the discovery of potentially valuable IP, the translation of the benefits from the early stage IP was difficult to realise, as the development activities could not reach a point where industry partners are willing to invest. Often opportunities are identified, but commercial development is abandoned due to the inability to find funding for the proof-of-concept and validation studies.

The Association of Australian Medical Research Institutes (AAMRI) also identified that development of early stage IP

may not fit within the scope of the National Health and Medical Research Council (NHMRC) Project Grant or the Australian Research Council (ARC) Discovery Grant schemes, and only very limited funding can be accessed through the sub-optimal NHMRC Development Grant scheme. Universities (but not MRIs or hospitals) are able to access the ARC Linkage Grant scheme, but this is not open to medical research projects.²²

This issue is more relevant for some sectors than others, and is particularly relevant in biotechnology where IP is often the only commodity being traded.

²² Association of Australian Medical Research Institutes, *Enhancing the Commercialisation Outcomes of Health and Medical Research*, Supplementary submission to the Strategic Review, p. 2 < http://www.mckeenreview.org.au/members/savefiles/2-AAMRI_Supplementary_commercialisation__submission_FINAL.pdf>

ACIP considers that determining the adequacy of activities to de-risk early stage IP is an important factor in creating a better environment for PFRO collaborations with industry. The more efficient the de-risking process, the greater the potential for the formation of collaborations. ACIP forwards the above issues in relation to de-risking to DIISRTE for consideration. ACIP is not making a recommendation on how to proceed in dealing with those issues.

4. Negotiation of collaboration agreements

Many industry and PFRO stakeholders stated that collaboration agreements take a long time to negotiate, anywhere between three and 12 months.

According to the IPRIA *Markets for Technology Survey 2010*, the mean number of months PFROs take to complete negotiated sales or licences of technology was 10 months (with a standard deviation of seven months).

Industry partners identified the delays in negotiations with Australian PFROs as a major obstacle to forming collaborations, as shown in Figure 10 below.

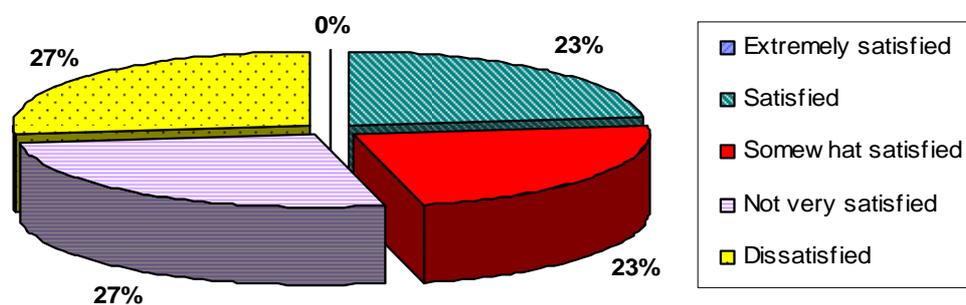


Figure 9: The level of satisfaction with the average timeframe for negotiating collaborations

Many industry and PFRO stakeholders felt that negotiation with industry works well at a technical level (researcher to researcher). Aspects of a negotiation that relate to the scope of work, definition of deliverables, project milestones and timeframes are typically easy to negotiate.

Delays and complexities were said to occur when other issues come to be considered. These include the following (not necessarily in the order of difficulty):

- ownership of project IP
- dealing with future improvements
- ownership of IP developed by students
- rights to use project IP for research and educational purposes
- benefit sharing from project IP
- identification of, and rights to use background IP
- valuing early stage IP
- costing of PFRO and industry inputs (e.g. facilities, staff)
- publication rights
- confidentiality

- moral rights in publications
- warranties and indemnities
- exclusions and limitations of liability
- commercial terms generally.

Specific comments on certain issues appear below.

4.1 General understanding of IP issues

Intellectual property rights arising from collaborative research projects typically comprise a bundle of IP, including both registrable IP (such as patent applications and ultimately patents), and IP that is not necessarily registered (such as know-how, confidential information and copyrights).

In addition, collaborative R&D projects typically require identification of, and differentiation between **background** IP already developed either by parties to the collaboration or external parties, and **project** IP that is created in the course of a collaborative project.

Some industry respondents expressed the view that some collaborations were difficult to negotiate because both PFROs and industry lack understanding of IP issues, including identifying and dealing with background and project IP. It was suggested that specialist training should be provided to PFROs and industry (particularly SMEs) in relation to the proper identification and management of these two types of IP.

ACIP endorses this proposal and recommends the development of educational resources and tools to assist PFROs and industry to understand IP issues in collaborations (see Recommendation 2 below).

4.2 IP ownership issues

Negotiations regarding the ownership of IP created in the process of collaboration (project IP) can prove difficult. They necessitate understanding of the purpose, benefits and costs of IP ownership.

It was reported that an analysis of ‘purpose, benefits and costs’ was not always undertaken, but that an unthinking requirement of ownership was presented as the position of a party.

It was suggested that a ‘right to use’ or a ‘right to benefit share’ may be more appropriate alternatives to IP ownership in some cases.

Some stakeholders also pointed out that the negotiation of ownership of future improvements on project IP and ownership of any serendipitous discoveries can also cause delays in negotiations. This can be counter-productive when, in reality, improvements may have limited potential to add significant (commercial) value to collaborations and serendipitous discoveries are unlikely to occur.

Another point raised by industry stakeholders is that Australian PFROs have differing internal policies and procedures regarding IP ownership. The ownership of IP developed by university students and third parties working at PFROs (e.g. interns and visiting researchers) were highlighted as areas where significant differences occur. Some universities make funds available for students to seek legal advice regarding IP ownership, while other universities do not allow students to participate in commercial projects.

Bayh-Dole Act

Roundtable participants were asked whether the principles of IP ownership in collaborations should be legislated, similar to the framework adopted in the United States *Patent and Trademark Law Amendments Act 1980* (the Bayh-Dole Act). There was a common view shared by both PFRO and industry stakeholders that such legislation would not be helpful in facilitating collaborations in Australia. This view was also found in Christie et al (2003).²³ It is beyond the scope of this review to fully address this issue. However, ACIP has received no evidence suggesting that there was a need for Bayh-Dole type legislation to be enacted in Australia.

UWA v. Gray

Another issue discussed in the context of IP ownership was the effect of the *UWA v. Gray* case on the formation and management of collaborations.²⁴ It was pointed out that the case has heightened industry attention to the chain of ownership of IP developed by PFRO staff in the course of their employment. There was a general agreement that the case was well communicated to PFROs and industry, and as such, there were no significant ongoing concerns about its effect on PFRO/industry collaborations. Both PFROs and industry indicated that they felt they had adapted to the judgment of the court.

4.3 Costing and valuation of inputs

ACIP was advised that it is not uncommon for parties to a collaboration to determine their share of the output by reference to their proportional inputs. Input contributions can be cash or in kind. A material number of industry respondents pointed to the non-transparent and inconsistent costing of PFRO input contributions as causing negotiation difficulties, e.g. the multiples used for overheads. Inconsistent costing within the same PFRO posed the greatest difficulties.

Additionally, it was stated that the valuation of IP can be problematic for both partners. This arises in two broad contexts: firstly, where IP was one of the input contributions to a collaboration, which in turn affected the output shares of the parties and, secondly, when IP was licensed for a charge, for example a royalty. Invariably,

²² Christie AF, D'Aloisio S, Gaita KL, Howlett MJ & Webster EM. (2003), *Analysis of the Legal Framework for Patent Ownership in Publicly Funded Research Institutions*, Australian Department of Education, Employment and Workplace Relations <http://www.dest.gov.au/sectors/research_sector/publications_resources/other_publications/patent_ownership_in_publicly_funded_research_institutions.htm>

²⁴ University of Western Australia (UWA) v Gray (No 20) [2008] FCA 49 and [2009] FCAFC 116.

industry took the view that PFRO valuations in both these contexts, particularly for early stage technology, were unrealistically high.

Industry representatives highlighted that significant contributors to the unrealistically high valuations presented by PFROs were a lack of understanding and experience of what is required to bring products arising from IP to market, and the risks associated with the commercialisation process.

ACIP considers that PFROs would benefit from being informed about the process of turning early stage technologies and IP into commercial products. One option put forward at the roundtables was that industry should take greater responsibility for training and educating PFROs (see Recommendation 2 below).

4.4 Confidentiality and publication issues

Retaining researchers' rights to publish and the ability to conduct ongoing research was reported to be absolutely essential to PFROs. At the same time industry requires protection of IP before any publications are released. The 'patent or publish' dilemma is typically resolved through the review of publications by industry partners and the establishment of agreed frameworks.

While industry generally recognised the need to publish and in many cases encouraged it, retaining confidentiality was identified as an issue which caused problems. Some PFRO representatives reported that some industry partners exceed the agreed time period allocated to the review of publications. Still others thought that confidentiality provisions sought by industry can be too broad. PFRO stakeholders also reported that these issues are typically resolved without causing significant difficulties.

Several industry stakeholders reported that some collaborations have not proceeded as a consequence of previous negative experiences with the leakage of information by PFROs, such as background IP that had been disclosed by an industry partner. Some industry representatives reported cases of inadvertent leakage of confidential information by PFROs to competitors.

Streamlining the processes of negotiating collaborations with industry

During consultations, ACIP identified several worthy suggestions and comments for improving the negotiation process and managing the transactions costs:

- Some industry representatives pointed out that some PFROs do not have allocated time frames for the approval and sign-off processes for commercial contracts with industry. If such time frames were available from both sides and communicated to each collaboration partner upfront, the time required to negotiate collaboration agreements could be better understood and better managed on both sides.
- The majority of stakeholders were of the view that Lambert-type standard agreements would not work, as every collaboration was unique and required

consideration of different issues. However, many suggested the development of a set of guiding principles to assist both sides to align their expectations.

- PFRO participants suggested the development of term sheet-like guides for initiating collaborations.

These views are consistent with those of ACIP. We believe that a better understanding of the issues by PFROs, industry and researchers would assist in the negotiation process.

ACIP recommends the development and promotion of educational resources and tools to assist PFROs and industry, particularly SMEs, to form and conduct collaborations.

Recommendation 2: Encourage the development and promotion of educational resources to assist PFROs, industry and researchers to form and conduct collaborations. Resources should be easily identifiable and accessible to all stakeholders, particularly PFROs and SMEs, and be supported by relevant training. Considerations should include:

- assessing available resources, tools and programs and how they may be best promoted and deployed. Particular focus should be on modules that can assist with:
 - aligning interests with expectations
 - expediting the negotiation of collaboration agreements
 - understanding the commercial/legal provisions in collaboration agreements
- a set of starting principles/questions to help partners focus, communicate and develop a good understanding of the objectives of their collaboration
- term sheet-like smart forms setting out all issues that need to be included in negotiations and possible options to deal with them
- a module focusing on background IP (contributed to a collaboration) and project IP (arising in collaborations), including the proper identification and management of both
- a module on valuation models of early stage technologies and IP
- providing PFROs with access to expert patent analytics services, related business intelligence tools and training.

4.5 Provisions in government contracts and grants

Many PFRO stakeholders shared the view that the standard terms sought by the Australian Government and its agencies when entering into agreements with PFROs, or providing grant funding to PFROs, can be unnecessarily onerous or impractical.

These terms negatively affect collaborations because of their flow on effect, that is, when the output of those agreements or grant funding is subsequently the subject of a proposed collaboration with industry.

Four specific issues were highlighted and are discussed in 4.5.1 to 4.5.4 below:

4.5.1 Broad compulsory background and project IP licences

These can extend beyond what can reasonably be required to support the Commonwealth's use of project IP.²⁵ Many stakeholders pointed out that the compulsory background²⁶ and project IP licences reduce the ability to collaborate and licence out the IP to other parties. In particular:

- Many stakeholders argued that such licences fettered PFROs' ability to grant exclusive rights to any future licensee(s) who may be offering to invest in the IP and commercialise it.
- The compulsory background and project IP licences prevent any future licensee(s) from being able to enforce their rights against infringers, because arguably they are not exclusive licensees within the meaning of s. 120(1) of the *Patents Act 1990*.
- PFROs will not always be able to grant background IP licences to the Commonwealth. This problem arises in situations when the background IP is not owned exclusively by the PFRO, although the PFRO may have rights to use it for research purposes. For example, if the collaborative project uses data obtained under licence from a third party, such as the OECD, the PFRO can use the data but it cannot provide a licence to the government to 'modify, adapt and exploit' such data.
- Such extensive licences were rarely required for use by the Commonwealth funding body in fulfilling its functions.

Australian PFROs provided ACIP with numerous examples of clauses that cause them problems in this area. One example of a broad compulsory background IP licence provision of concern to PFROs is included below (emphasis added).

Unless otherwise specified in item 1.1 to the extent that the Commonwealth needs to use any of the:

²⁵ Project IP is IP created **in the course** of the collaborative project. Project IP might also be referred to as foreground IP.

²⁶ Background IP is IP that exists **before** the collaborative project commences. This IP might be owned by any of the parties to the collaboration or by anyone else.

- (a) Pre-existing Material or Third Party Material provided by the Recipient;
or
- (b) Agreement Material,

in connection with the Project or Program, ***or for any other Commonwealth purpose***, the Recipient grants to, or must obtain for, the Commonwealth for the period specified in item 1.1 a world-wide, royalty free, non-exclusive licence (including the right to sublicense) to use, reproduce, adapt, modify and communicate that Material.

4.5.2 Broad warranties to the effect that background IP and project IP will not infringe the rights of any third party

The inclusion of these provisions required PFROs to indemnify the government against any loss or liability it may incur as a result of using such background or project IP.

This appears to challenge the core principle that ‘the risk should lie with the agency most capable of managing it’ because PFROs will not have any role in, or control over, the use of relevant background and project IP. Whereas the Australian Government can ascertain the extent to which its use of that IP may expose it to risk and then manage the risk.

An example of a broad IP warranties provision causing problems to PFROs is provided below (emphasis added):

The Service Provider (=PFRO) ***warrants that:***

- (a) the Pre-existing Material, Third Party Material, the Deliverables and the Contract Material (Warranted Materials) and ***the Commonwealth's use of the Warranted Materials will not infringe the Intellectual Property Rights of any person;*** and
- (b) it ***has the necessary rights*** to vest the Intellectual Property Rights and grant the licences as provided for in this clause.

4.5.3 Broad indemnities in general

Many PFRO stakeholders pointed out the Commonwealth often sought to impose indemnities that extend beyond the reasonable losses that would normally be recoverable at common law, and which may not be covered by PFROs’ insurance.

Stakeholders from industry and PFROs repeatedly noted that PFROs then try to shift these indemnities to industry, with an adverse impact on the formation of collaborations.

An example of a broad indemnity provision causing problems to PFROs is provided below:

The Contractor agrees to indemnify the Commonwealth from and against any:

- (a) loss or liability incurred by the Commonwealth;
- (b) loss of or damage to property of the Commonwealth; or
- (c) loss or expense incurred by the Commonwealth in dealing with any claim against it including legal costs and expenses on a solicitor/own client basis and the cost of time spent, resources used or disbursements paid by the Commonwealth,

arising from:

- (d) any act or omission by the Contractor, or any of the Contractor Personnel, in connection with this Contract, where there was fault on the part of the person whose conduct gave rise to that liability, loss, damage or expense;
- (e) any breach by the Contractor, or any of the Contractor Personnel, of its obligations or warranties under this Contract;
- (f) any use or disclosure by the Contractor, or the Contractor Personnel, of Personal Information held or controlled in connection with this Contract; or
- (g) the Commonwealth's use of the Contract Material and Existing Material for purposes permitted by this Contract.

4.5.4 Onerous moral rights provisions relating to PFRo authors, particularly academic authors

Moral rights have the meaning specified in the *Copyright Act 1968*. The moral rights of the creator of works are:

- the right of attribution of authorship in respect of the work
- the right not to have authorship of the work falsely attributed
- the right of integrity of authorship in respect of the work.²⁷

These rights subsist in all works, and remain with the original author. However, some funding agreements and consultancy agreements issued by both Commonwealth and state agencies have required PFRo (and their staff involved in a project) to grant consent to waive these rights. These waivers/consents potentially permit the funder to use research outputs in a broad variety of ways that would otherwise breach the moral rights of the individual researchers.

²⁷ **The right of attribution** is a right to be identified as the author of a work; false attribution means to associate someone else's name with a work in a way that falsely implies that person is the author of the work.

The right of integrity of authorship is the right not to have the work subjected to derogatory treatment, such as the doing of anything that results in a material distortion, mutilation of, or alteration to, the work that is prejudicial to the author's honour or reputation.

Furthermore, onerous moral rights provisions also affect PFRO collaborations with industry in several ways:

- If a PFRO works with industry on a particular project funded by a Commonwealth funding agency, the PFRO is typically required to contractually pass any moral right obligations to industry collaborators (i.e. require the industry collaborator to obtain consents/waivers from its employees). This can cause contractual difficulties and negotiating delays between the PFRO and its industry partners.
- Moral rights consent requirements on PFRO researchers may cause problems with engaging PFRO researchers in industry projects. It was reported that this was more likely to be the case with more experienced researchers who were concerned that the giving of moral rights consent will affect their professional integrity.

An example of moral rights provisions causing problems to PFROs is provided below (emphasis added):

Each Collaborator ***must provide*** the Department with an ***irrevocable and unconditional consent*** from each individual author of a Work to:

- (i) any act or omission that would otherwise infringe that author's Moral Rights in relation to the relevant Work;
 - specifically, make alterations to or deletions from the relevant Work; and
 - specifically, any failure to attribute authorship of the relevant Work to that author.

Each Collaborator warrants and represents that each consent contemplated by clause (a) has not been obtained under duress or as a result of any false or misleading statements by the Collaborator.

Discussion

The Attorney General's Department (AGD) and the Department of Finance and Deregulation (DoFD) share prime responsibilities for determining the IP ownership, indemnities and warranties in government contracts. AGD is responsible for the *Intellectual Property Principles for Australian Government Agencies* (IP Principles) which provide good guidance in this regard, stating that:

- (government) agencies should maintain a flexible approach in considering options for ownership, management and use of IP (Principle 8)
- agencies should be responsive to opportunities for commercial use and exploitation of IP, including by the private sector (Principle 13).²⁸

ACIP also understands that DoFD and ADG, with assistance from other government departments, have recently released updated guidelines for government agencies on IP

²⁸ <<http://www.ag.gov.au/Documents/Statement%20of%20IP%20Principles%20for%20Australian%20Government%20Agencies2.doc>>

management and licensing issues. These include the updated *Australian Government Intellectual Property Manual*²⁹ and the *Guidelines for Licensing Public Sector Information for Australian Government Agencies*.³⁰

ACIP also understands that DoFD is responsible for the administration of the *Financial Management and Accountability Act 1997* and associated regulations, which include responsibilities of Commonwealth Government agencies, including those relating to IP ownership and licensing.

The IP Manual states that government agencies should differentiate between procurement and grants when making decisions about their preferred IP management approach.

With regard to ownership of project IP, the Manual states that:

Ownership of IP resulting from activities undertaken with the benefit of grant money will generally be allocated taking into account all relevant issues, such as:

- the purpose of the grant
- the amount of existing IP contributed by the grant recipient
- the extent of contribution (in monetary and other terms) by the grant recipient to the development of Project IP
- the extent to which imposing ownership will operate as a disincentive to the effective use or commercialisation of the Project IP, and
- the benefits to the public by imposing ownership conditions on the Project IP.

The Agency should generally not assert ownership of the Project IP, but may consider requiring the grant recipient to give the agency a royalty-free licence to use that IP. If any third party IP is involved in the use of the Project IP, the agency may need a licence to use the third party IP as well.

The second last sentence of the previous paragraph is of particular importance, in that it identifies not only that the agency should not necessarily assert ownership of Project IP, but that obtaining a royalty free licence may be sufficient.

In addition to the development of the IP Manual, ACIP has been made aware of a number of other initiatives which have focussed on increasing the flexibility of contractual arrangements between the Commonwealth and research organisations.

The Department of Education, Employment and Workplace Relations (DEEWR), the Department of Health and Ageing (DoHA), the former Department of Innovation, Industry, Science and Research (DIISR) and AGD have negotiated with the Group of Eight universities on a number of clauses relating to IP rights—including moral rights—and developed a *University IP Clauses Users' Guide*. This guide contains a range of optional clauses suitable for use by the above Australian Government

²⁹ <http://www.ag.gov.au/intellectualproperty/Pages/IntellectualPropertyManual.aspx>

³⁰ <<http://agimo.govspace.gov.au/files/2011/02/Draft-Guidelines-on-Licensing-Public-Sector-Information-for-Australian-Government-Agencies.pdf>

agencies across a variety of scenarios to assist with drafting and negotiating research contracts.

Similarly, the CSIRO has a number of examples which they have indicated to ACIP they would be willing to develop into a portfolio of case studies, highlighting the need for Australian Government agencies to also consider the downstream effects of the IP rights, warranties and indemnity clauses in their research contracts with PFROs.

In spite of these initiatives and available guidelines, the use of more flexible arrangements by Commonwealth agencies appears to be limited. There does not seem to be any coordinated mechanism for driving their use or monitoring the extent of their implementation.

In light of the above, ACIP recommends that the Coordination Committee on Innovation (CCI) be asked to undertake a range of activities relating to the provisions in government contracts, particularly background and project IP licences, warranties, indemnities, and moral rights sought by the Australian Government agencies. Consideration should include the uptake and implementation of the IP Principles by Australian Government agencies.

CCI is a discussion forum for Australian Government departments and agencies with responsibilities or interests that impact on the national innovation system. CCI comprises representatives from thirty Commonwealth Departments and Agencies. CCI is also responsible for the establishment and management of working groups to investigate and progress issues referred through the Minister for Industry and Innovation.

ACIP is also aware that DoFD convenes a discussion forum for Commonwealth Procurement Officers. This forum could be used as an additional communication and awareness-raising channel.

Recommendation 5: Request that the Coordination Committee on Innovation (CCI) promote and encourage the use of flexible terms and conditions in Australian Government grants and research contracts, including those specifically related to background and project IP licences, warranties, indemnities and moral rights.

Considerations should include:

- collating and communicating information about existing initiatives and previous work undertaken in relation to such terms and conditions and the circumstances in which their flexible application is appropriate
- increasing awareness among Commonwealth and PFRO legal and procurement practitioners of the flexibility available in the terms and conditions of Australian Government grants and research contracts (including those specifically related to background and project IP licences, warranties, indemnities and moral rights)
- establishing a process for government agencies to report on the extent that such flexibility is being applied.

5. Managing collaborations

5.1 Project management skills

A key issue consistently highlighted in consultations with PFROs was their lack of internal project management skills and staff with industry exposure to the management of large, inter-organisational projects.

Industry stakeholders also reported this skills gap in PFROs.

A vast majority of PFRO representatives concurred that having professional project management skills available would assist in both facilitating and implementing collaborations with industry. However, many pointed out that they are often unable to hire experienced project managers with industry experience.

This lack affects:

- on time completion of projects
- on time and meaningful reporting of the results of projects
- proper management of IP arising from projects
- proper confidentiality practices being put in place for projects
- ensuring compliance with project budgets.

PFRO project management capability would improve the operation of collaborations. Ideally PFROs should engage properly trained project managers.

Industry stakeholders generally accept that this is unlikely to happen in the near future. Where feasible, industry partner invest more internal resources themselves. In fact, many stakeholders suggested that collaborations have worked best when industry undertook the project management role, even if informally.

Industry management of collaborations has also helped PFROs to develop their understanding of the commercial imperative. Continually reinforcing time frames to PFROs has been an important element in achieving objectives.

ACIP considers that improving project management skills in PFROs would significantly improve the formation and conduct of collaborations.

ACIP therefore recommends that mechanisms be introduced:

- to increase project management skills in PFROs
- to allocate resources to support project management in PFROs.

Recommendation 4: In order to improve their collaborations with industry, PFROs need to increase project management skills and capability. Consideration should be given to:

- PFROs allocating additional resources to support project management, and developing and maintaining appropriate skills including through staff exchanges with industry.

5.2 IP management policies and practices

PFROs are responsible for developing and implementing policies and procedures to identify, capture, manage and commercialise their IP. These policies are guided by the *National Principles for Intellectual Property Management for Publicly Funded Research*.

The Principles provide some guidance with regard to protection, ownership, exploitation and management of IP funded by the government and generated by PFROs.

They are currently being reviewed by the Coordination Committee on Innovation (CCI).

Industry raised three broad concerns about the principles:

- that they are too broad
- that their implementation is the sole responsibility of PFROs, and there is no accountability for failing to implement or for not implementing them satisfactorily
- that some PFROs are not transparent about their IP management policies and do not implement them consistently.

Some PFRO stakeholders also felt that greater clarity and transparency around internal IP policies would assist collaborations, particularly with multi-party collaborations, consortia and pooling of IP assets, which have become more frequent in recent years. These types of arrangements can lead to greater complexity in drafting agreements, managing IP and assigning responsibilities.

ACIP considers that inconsistency within and across PFROs in the management of IP can be a disincentive for industry to collaborate.

We also note the 2007 Productivity Commission recommendation that public sector agencies and universities ensure a consistent management of IP to reduce transaction costs for businesses dealing with them. The report also suggested there may be value in commissioning further work on the costs and benefits of moving towards greater consistency in the management of IP across various PFROs.³¹

³¹ Productivity Commission, *Public Support for Science and Innovation*, 286.

ACIP endorses this recommendation.

We also make the following comments on the revised Principles released by CCI in May 2012:

- Despite significant improvements made to the revised Principles, it remains unclear whether they cover all publicly funded research within PFROs or only that resulting from government competitive funding.
- It is further unclear whether the Principles aim to provide guidance regarding PFRO activities that are partially or fully funded by non-government entities.
- ACIP is also concerned that the Principles do not provide any guidance to PFROs with regard to application of the Principles by PFROs in practice.

ACIP recommends that the Principles should provide guidance for all types of publicly funded research conducted by PFROs, not only competitive grants.

ACIP further recommends that mechanisms be developed to encourage PFROs to introduce continual improvement to, and implementation of, their internal policies for IP management. One such mechanism could be to include in the Commonwealth mission-based compacts with each university reference to universities implementing continual improvement strategies.

Recommendation 6: Ensure that the *National Principles of Intellectual Property Management for Publicly Funded Research* (currently being reviewed by CCI):

- cover *all* publicly funded research conducted by PFROs
- encourage PFROs to introduce continual improvement to, and implementation of, internal policies and procedures for IP management. Consideration should be given to:
 - including reference to implementing continuous improvement processes in the Commonwealth's mission-based compacts with universities.

Appendix A. List of industry submissions received

Alchemia Ltd
Alcoa World Alumina Australia
AusDiagnostics Pty Ltd
Aussie Colours Pty Ltd
Australian Institute of Company Directors
BioMelbourne Network
BlueScope Steel Ltd
Calix Ltd
Canon Information Systems Research Australia Pty Ltd
Clinical Genomics Pty Ltd
Consolidated Minerals Pty Ltd
Dairy Innovation Australia Ltd
Department of Agriculture and FoodWA, R&D Procurement
Flippa Pty Ltd
Fusidium Pty Ltd
Genesis Petroleum Technologies Pty Ltd
Geosoft Australia
Immune System Therapeutics Ltd
Interpath Pty Ltd
Licensing and Technology Management Pty Ltd
Memcor Australia Pty Ltd
Microsoft Pty Ltd
NFA Innovations Pty Ltd
NuPlant
Progen Pharmaceuticals
Queensland Law Society
Shuffle Master Australasia
Siemens Water Technologies Corporation
Tectonica Australia Pty Ltd
Water Corporation
Westpac Banking Corporation

Appendix B. List of submissions received from Australian PFROs representatives and staff

Adelaide Research and Innovation Pty Ltd
Business Development Office, Walter and Eliza Hall Institute
CAST CRC
Centre for Technology Diffusion, La Trobe University
CRC for National Plant Biosecurity
CRC for Remote Economic Participation
Dental School, The University of Melbourne
Department of Biomedical Engineering, Flinders University
Enterprise Services – Commercialisation, CSIRO
Faculty of Engineering, The University of New South Wales
Griffith Enterprise
The Group of Eight Universities
Industry Engagement Office, Deakin University
Innovation and Commercial Development Office, Victoria University
The Institute for a Broadband-Enabled Society, The University of Melbourne
Knowledge Commercialisation Australasia
Legal Office, The University of Ballarat
Legal Office, National ICT Australia Limited (NICTA)
Ludwig Institute for Cancer Research
Melbourne Institute for Applied Economic and Social Research
New South Innovations Pty Ltd
Office of Industry and Innovation, The University of Western Australia
Office of Innovation and Consulting, University of Western Sydney
Parker Centre Ltd
PhD Candidate, Department of Economics, Macquarie University
Research Collaboration and Partnerships Team, RMIT
Research and Innovation Division, University of Wollongong
The Society of University Lawyers
Sydnovate, The University of Sydney
Technology Transfer Office, Ludwig Institute for Cancer Research
The University of New South Wales
Wound CRC

Appendix C. List of industry representatives who attended industry roundtables

Perth, 3 December 2010

R&D Procurement Director, Alcoa World Alumina Australia
Senior Research Scientist, Alcoa World Alumina
Managing Director, Geosoft Australia
Partner, Freehills
CEO, Entecho Pty Ltd
Partner, Wrays Intellectual Property
R&D Manager, Consolidated Minerals
Manager, R&D and Government Incentives, Deloitte
Commercialisation Officer, Department of Agriculture and Food

Melbourne, 11 March 2011

CEO, AusBiotech
Commercial Manager, Dairy Innovation Australia Ltd
Director, Business Development, CSL Ltd
Intellectual Property Manager, Assa Abloy
Executive Director, NFA Innovations Pty Ltd
Managing Director, Textor Technologies Pty Ltd
Managing Director, Licensing and Technology Management Pty Ltd
CEO, Clarinox

Brisbane, 15 March 2011

Managing Director, Arden Architectural
VP Business Development, Alchemia Pty Ltd
CEO, Progen Pharmaceuticals
Chairman, Bond Wireless
Managing Director, Fusidium Pty Ltd
Director, Aussie Colours Pty Ltd
Managing Director, Nuplant
General Manager, Magnetica Ltd

Sydney, 25 March 2011

Director, Intellectual Property, Bluescope Steel
IP Manager, Canon Information Systems Research Australia
General Manager, IP and Legal Division, CISRA
Senior Legal Officer, CISRA
CEO, Clinical Genomics Pty Ltd.
Head of IP Strategy, Cochlear Ltd
R&D Manager, Australia and ASEAN, DuPont
Chief Technologist, IBM Australia
CEO, Immune System Therapeutics Ltd
Vice President, Intellectual Property, ResMed Ltd
Patent Attorney, ResMed Ltd
Counsel, Commercial, Technology and IP Group, The Westpac Group

Adelaide, 23 September 2011

CEO, Ellex Medical Laser Limited

IP Manager, Signostics

Managing Director, Gene Works Pty Ltd

Managing Director, NyPa Australia Ltd

Engineering Manager, SAAB Systems

Engineering Director, BAE Systems

Deputy General Manager, Deep Blue Tech Pty Ltd

Vice President, R&D, Bionomics Ltd

Appendix D. List of PFR0 representatives who attended ACIP roundtables

Adelaide, 22 March 2011

Managing Director, Adelaide Research and Innovation Pty Ltd
Corporate Lawyer and Company Secretary, Adelaide Research and Innovation
IP and Legal Manager, Flinders Partners
Commercial Development Director, Flinders Partners
General Manager, Commercialisation, ITEK Pty Ltd
Manager, Contracts and IP, South Australian Research and Development Institute (SARDI)
Director, Business Commercialisation Office, Defence Science and Technology Organisation
Leader, Flinders Medical Devices and Technologies
Business Manager, Women's and Children's Health Research Institute
Research Professor, Women's and Children's Health Research Institute
Business Development Manager, BioInnovation SA
Director, Contracts, Hanson Institute
IP and Commercialisation Manager, Hanson Institute
Deputy Director, Adelaide Research and Innovation Pty Ltd
Legal Counsel, the University of Adelaide
General Manager, the Open Technology Foundation, Carnegie Mellon University

Brisbane, 21 September 2011

Chief Executive Officer, QUT Bluebox
General Manager and Director of Strategic Partnerships, Eidos Institutes
Deputy Director, Griffith Enterprise
Chief Executive Officer, CAST CRC
General Manager, Life Sciences, UniQuest Pty Ltd
Chief Executive Officer, IMB Com Pty Ltd
Chief Operating Officer, CRC for Optimising Resource Extraction
Principal Project Officer, Office of Health and Medical Research, Queensland Health
Chief Executive Officer, Life Sciences Queensland
Executive Director for Science, Queensland Government
Principal Project Officer, Intellectual Property, Office of Health and Medical Research, Queensland Health
Commercial Contracts Lawyer, Office of Commercial Service, QUT
Manager, Commercial Research and Consultancy Projects, QUT
Manager, Research Development, Central Queensland University

Melbourne, 7 October 2011

Director, Monash Asia-Pacific Centre for Science and Wealth Creation
CEO, Oral Health CRC
Chief Operations Manager, CAST CRC
Director, Technology Commercialisation Group, Office of Science, Technology and Commercialisation, Victorian Government
Chief Executive Officer and Company Secretary, Agriculture Victoria Services Pty Ltd

Executive Director, Legal Services, University of Melbourne
University Counsel, University of Ballarat
Manager, Research and Development, La Trobe University
Business Development Manager, Murdoch Children's Research Institute
Chief Executive Officer, Swinburne Ventures Pty Ltd and Director, Swinburne
Knowledge Pty Ltd
Director, Industry Engagement, Monash University
Director, Centre for Technology Diffusion, La Trobe University
Director, Research Partnerships Office Deakin University
Executive Officer and Manager, Melbourne Health
Research Collaborations and Partnerships, RMIT
Principal Research Fellow, Melbourne Institute of Applied Economic and Social
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Sydney, 13 October 2011

Associate Director (Innovation), University of Western Sydney
General Manager, IP and Licensing, CSIRO Operations
Chief Executive Officer, Smart Services CRC
IP Counsel, NICTA
Director, Engineering and Technology Development, NICTA
PhD Candidate, Department of Economics, Macquarie University
Director, Sydnovate
General Manager, Commercialisation, New South Innovations Pty Ltd
Senior Project Manager, Office of the NSW Chief Scientist

Appendix E. Major government programs supporting collaborations between industry and PFROs

Cooperative Research Centres (CRC) program

The Australian Government's Cooperative Research Centres (CRC) program, an Australian government initiative since 1991, supports medium to long term end user driven research collaborations to address clearly articulated, major challenges facing Australia, many of which are global challenges. The program supports the foundations of long term competitiveness in a given sector through its contributions to driving innovation through applied research, capacity building (e.g. skills formation and workforce development) and other activities that transcend the needs of individual partners.

Since the program began in 1991, 190 CRCs have transformed Australian health care, agriculture, the mining and manufacturing industries, environmental management, information and communications systems, and have helped to close the Indigenous gap. The Australian Government has committed more than \$3.4 billion in CRC program funding. Participants in CRCs have committed a further \$10.9 billion in cash and in-kind contributions.

CRC collaborations involve researchers, industries, communities and governments, but must include at least one Australian end user and at least one Australian higher education institution (or a research institute affiliated with a university). The program strongly encourages engagement with SMEs as well as international partners and offers a range of innovative and flexible mechanisms to allow such diverse organisations to collaborate for innovation.

Each CRC has a research agenda driven by end user needs. End users are involved throughout the development of new technologies from design stage through to adoption and commercialisation.

Another core element of each CRC is its industry-focused education and training activities. Strong industry involvement means that CRCs are able to offer students at all levels exposure to real world challenges as well as leading industry experts. These experiences are essential for supporting industry skills development.

The CRC program, through its unique design of combining world class research with end-users, a mandatory industry-focused education and training program as well as a strong focus on SME engagement and international collaboration, has delivered remarkable economic, social and environmental benefits to Australia. The program has contributed directly to improving skills and expanding research capacity, increasing innovation in business, government and the community sector and boosting collaboration – within Australia and between Australia and other countries.

Commercialisation Australia

Commercialisation Australia was announced as part of the 2009–10 Federal Budget and is an important component of the Australian Government's 10 year vision *Powering Ideas: An Innovation Agenda for the 21st Century*.

It aims to build the capacity of, and opportunities for, Australia's researchers, entrepreneurs and innovative firms to convert innovative intellectual property into successful commercial ventures. This will enhance Australia's participation and competitiveness in the global economy and generate commercial returns from Australia's significant investment in public sector research.

Commercialisation Australia bridges the resources gap between R&D (supported by the R&D Tax Incentive) and early stage venture or strategic investment (supported by the Innovation Investment Fund program). It is at this very early stage that entrepreneurs find it difficult to raise capital. Commercialisation Australia effectively leverages the scarce resources available to better prepare business opportunities for downstream commercial interests.

Commercialisation Australia is headed by Chief Executive Officer, Doron Ben-Meir who has a deep understanding of the industry, having been a founder or co-founder of six start-up businesses himself before taking up his current role with Commercialisation Australia.

He is supported by an independent advisory board equipped with the technical and commercial expertise to assess and provide advice on the merit of grant applications, and to provide advice on strategic matters in relation to the program and the commercialisation of intellectual property in general.

Program assistance is open to Australian companies, researchers and innovators who have completed their basic research and are now seeking to commercialise their innovative intellectual property.

Commercialisation Australia provides financial assistance through grants and access to skills, knowledge and networks through experienced Case Managers and Volunteer Business Mentors.

There are four types of grants available:

- **Skills and Knowledge** grants of up to \$50 000 to access expert advice and services
- **Experienced Executives** grants of up to \$350 000 to engage an experienced CEO or other senior executive
- **Proof of Concept** grants of up to \$250 000 to assist with proving the commercial viability of a new product, process or service
- **Early Stage Commercialisation** grants of up to \$2 million to assist with bringing a new product, process or service through to market.

All Commercialisation Australia participants work with an experienced Case Manager to guide them through the commercialisation process. Case Managers are experienced business builders, many having taken their own products to market. Participants also have access to the network of Volunteer Business Mentors who are able to share their own experiences and help them make important business connections.

Commercialisation Australia has a funding allocation of \$278 million over the five years to June 2014, with ongoing funding of \$82 million per year thereafter. Since opening to applications in January 2010 it has assisted more than 272 innovative companies and researchers and allocated \$106.1 million in grants.

Additional information about the program and all its Participants is available at www.commercialisationaustralia.gov.au.

Enterprise Connect

Enterprise Connect is an Australian Government program that provides support to eligible Australian SMEs, through a national network of 12 centres with a team of around 100 highly skilled business advisers and facilitators.

The objective is to help Australian firms develop the skills, tools and knowledge needed to improve their competitiveness and productivity and to maximise their growth potential.

The core service of the Enterprise Connect program is the Business Review which is conducted by Enterprise Connect business advisers. The Business Review works through the operational and strategic position of the client, and results in a detailed examination and a series of recommendations for improvement.

Following a review SMEs can access a range of services including:

- Tailored Advisory Service – provides up to \$20 000 of matched funding to implement changes identified through the Business Review
- Continuous Improvement Program: a three-year change management program for eligible Australian businesses to build a culture of continuous improvement across the entire range of business activity
- Workshops, Industry, Intelligence and Networking (WIIN): seminars, workshops and networking opportunities covering a range of themes for small and medium businesses
- Technology and Knowledge Connect: a no-charge service connecting Enterprise Connect clients with the latest technology, technical knowledge and market intelligence.

The Enterprise Connect Researchers in Business (RiB) program aims to support the placement of researchers from universities or public research agencies into businesses that wish to develop a new idea with commercial potential.

RiB works toward breaking down the cultural divide between business and the research sector and accelerate the adoption of new ideas and technologies by firms in the SME sector. The program provides 50 per cent of salary costs (up to \$50 000) to businesses that place a researcher for between two and 12 months.

R&D Tax incentive

The R&D Tax Incentive is an entitlement-based program under which companies conducting R&D activities may be entitled to tax benefits. The program applies to R&D activities and expenditure in income years commencing on or after 1 July 2011.

It has two components:

- a 45 per cent refundable R&D tax offset for SMEs with an aggregated turnover of less than \$20 million per annum (refundable means that companies in tax loss may be able to receive a cash refund)
- a 40 per cent non-refundable tax offset for all other eligible companies (aggregated annual turnover of \$20 million and above).

Benefits for PFROs

The R&D Tax Incentive supports collaborative R&D activities and this can help generate benefits for PFROs, businesses and the Australian economy.

PFROs, including universities, publicly funded research agencies and participants in Cooperative Research Centres (CRCs) can collaborate with businesses on R&D to:

- build valuable contacts and networks
- become more visible to business clients seeking R&D services
- contribute to research that can have a direct commercial impact.

The incentive includes the following features that can help PFROs to achieve these advantages while helping to increase Australia's innovative capacity;

Contract research

Eligible companies can contract the expertise of PFROs or other organisations and claim the R&D tax offset. These offsets reduce the cost to businesses of undertaking R&D.

Research service providers (RSPs)

PFROs have the opportunity to register as RSPs. As RSPs they can utilise their skills and expertise in conducting R&D to offer assistance to SMEs that do not have in-house R&D facilities.

To allow more companies to take advantage of Australia's highly-skilled public and private research sector, the minimum R&D expenditure threshold of \$20 000 is waived for companies that use RSPs.

Cooperative Research Centres under the R&D Tax Incentive

CRC contributor companies can claim the incentive for their monetary contributions under the CRC program where these contributions are spent on R&D activities. The minimum expenditure threshold is also waived for contributions to a CRC.

Treatment of university spin-out companies

Tax exempt entities such as universities can benefit from the new rules concerning the ownership threshold for spin-out companies controlled by such entities.

The 45 per cent refundable tax offset component is open to eligible companies with less than 50 per cent ownership or control by tax exempt entities such as universities.

Companies that are at least 50 per cent owned or controlled by tax exempt entities are still supported under the program and can benefit from the 40 per cent non-refundable tax offset.

Benefits for SMEs

The R&D Tax Incentive provides more generous base rates of support to businesses, especially targeting increased support for R&D by SMEs.

The program provides a 45 per cent refundable R&D tax offset for SMEs with an aggregated turnover of less than \$20 million per annum. This represents a doubling of the base rate of support available to SMEs compared to the previous program. SMEs in tax loss situations may be able to receive a cash refund and there is no limit to the amount of eligible R&D expenditure that can be claimed.

Quarterly credits

The government will introduce quarterly credits under the R&D Tax Incentive from 1 January 2014. This will allow eligible SMEs to access benefits sooner, thereby improving their cash flow.

Appendix F. Acronyms

ABS	Australian Bureau of Statistics
ACIP	Advisory Council on Intellectual Property
AGD	Attorney-General's Department
AIMS	Australian Institute of Marine Science
ANSTO	Australian National Nuclear Science and Technology Organisation
ARC	Australian Research Council
ATN	Australian Technology Network
CCI	Coordination Committee on Innovation
CSIRO	Australian Commonwealth Scientific and Research Organisation
DEEWR	Department of Education, Employment and Workplace Relations
DIISTRE	Department of Industry, Innovation, Science, Research and Tertiary Education
DoFD	Department of Finance and Deregulation
DoHA	Department of Health and Ageing
DSTO	Defence Science and Technology Organisation
ERA	Excellence in Research for Australia
Go8	Group of Eight
IP	intellectual property
IPRIA	Intellectual Property Research Institute of Australia
KPIs	key performance indicators
NHMRC	National Health and Medical Research Council
PFROs	publicly funded research organisations
SMEs	small and medium enterprises
TTOs	technology transfer offices

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