Strengthening Links Between Industry and Public Sector Research Organisations

COMMUNIQUÉ
This Communiqué reflects the views expressed by delegates to the Workshop. Following the Workshop, a draft Communiqué was developed based on the presentations and comments made at the Workshop. Delegates were then invited to comment on the draft; comments received were considered in developing the final Communiqué.

SUMMARY

- Current research suggests that the innovative potential of a nation is not directly proportional to its spending on R&D. The absorptive capacity of industry is a key determining factor in adequately capturing the outcomes of public sector R&D, with trusted intermediaries on both sides having important roles to play. Studies show that a much greater value for business arises from direct collaboration with staff in Public Sector Research Organisations (PSROs) rather than from perusal of academic outputs in journals and the like. In terms of extent of industry-PSRO collaboration, Australia ranks near the bottom of the OECD league table.

- Doubling the level of Australia’s industry-PSRO collaboration would yield a significant innovation dividend but is seen as a stretch target requiring policy change. In this regard overseas countries have implemented a number of useful policy frameworks which can provide guidance to Australia. Australia needs an articulated policy which shows how research excellence at one end links to the rationale for generating impact from this at the other. No magic bullet is available, but the aim must be to get more recognition of “D” into universities and appreciation and receptivity of “R” into industry.

- CRC, ARC Linkage, Enterprise Connect and Commercialisation Australia are all initiative in the right direction but are under-resourced. Much simpler, more nimble (and more rapidly implemented) schemes are needed. It is desirable to give industry partners a greater role in project management and in some cases to make non-repayable grants directly to industry.

- Transaction costs of collaboration are too high. Legal complexities between industry and PSROs need to be simplified. They are presently too dominated by risk avoidance.

- Research organisations will work on activities which get measured and rewarded. As universities are not really rewarded for collaboration, the funding formula has to change to specifically reward collaboration. ERA in its present form is unlikely to change the amount of collaboration or the innovation dividend. The introduction of some targeted schemes at around two to three percent of total R&D funding (such as Third Stream funding and/or Knowledge Transfer Partnerships – as in the UK) would drive positive behaviour in universities and industry.
RECOMMENDATIONS

It is recommended that:

- Mechanisms be put in place to capture the benefits of research and to direct research to problems of national importance including the support of those industries providing employment to Australians, especially emergent industries that will generate the next wave of employment.

- Government, through its Compact Negotiations with universities, actively seeks to change their culture towards greater collaboration with business and industry, especially in appropriate disciplines, and to encourage a top-down embrace of collaborative innovation.

- Government introduces additional funding, such as third-stream funding to reward institutions that are effective in collaboration. UK experience suggests that the level of this funding would need to be three to five percent of total funding to have a significant cultural impact. To this end, the possibility of claw-back and redistribution of institutional income should be contemplated. A framework will need to be developed to assess the quality and magnitude of such collaboration.

- As an alternative, Government reconfigures ERA in appropriate disciplinary areas to measure and pay attention to the innovation dividend accruing from publicly funded research, carrying this aspect forward to any ERA-based funding model.

- Government explored the option of industry associations playing a greater educative role in improving the knowledge responsiveness of SMEs and of being promoters of pre-competitive research – with the possibility of supportive funding for such activities being provided. Industry associations should also be encouraged to foster cross-sectoral engagements.

- Better ways be found of making industry aware of what expertise is available in PSROs and making PSROs more aware of industry needs. Uniquest offers an effective information transfer model.

- Government works with the Venture Capital industry to rebuild funding opportunities for early-stage innovations.

- Government encourages superannuation companies, including UniSuper, to set aside a small proportion of their members’ funds to support the early stage development of promising technology.

- Current Government schemes be augmented and supplemented by new schemes if collaboration targets are to be met.

- Government considers that there is a strong case for a more nimble, more industry-focused Linkage Grant or mini-CRC scheme which has the flexibility of rapid award, variable project length and industry-based research goal setting and management. Maintaining accountability and probity while reducing the running cost of the scheme would also be useful to explore.

- Government through DIISR to consider a Commonwealth-wide adoption of the (NSW, QLD and SA) voucher system for SMEs to purchase the research expertise of PSROs.

- Certain of the beneficial features of the UK Knowledge Transfer Partnerships (KTP) scheme and the U.S. Small Business Innovative Research (SBIR) scheme be profitably employed in new or revised Australian funding programs. These include greater involvement of the industry partner in setting the research agenda and the possibility of payment of Government funds direct to firms.

- Preferential allocation be given (as in the US) in existing government funding programs for industry R&D where there is demonstrable collaboration between industry with PSROs.

- Government, in concert with Universities Australia and industry organisations, such as AIRG, explores how the TTOs of Australian universities can be made more effective, both as knowledge transfer agencies and as training grounds in the innovation process. This process could involve proposing amalgamations and providing part funding for TTOs based on university success in collaborative research, effectiveness of training and bringing research through to commercialisation.

- A policy stable environment be developed for innovation-stimulating initiatives in the interests of ensuring a policy continuum to foster long-term collaborative relationships between industry and PSROs and that bipartisan support.
Strengthening Research Links

1. The Innovation Dividend from Public Sector Research

Delegates noted the current international concern about the real payback from publicly funded research (Innovation Dividend and the Swedish Paradox). Speakers indicated that good basic science and invention did not necessarily lead to innovation that would raise the productivity of a nation with the linear model now being substantially discredited. For good science to be applied required that industry knowledge receptors were in place. Knowledge itself is cumulative and additive, while innovation is combinatorial. Recognising this means that the processes for capturing the outcomes of public sector research are necessarily collaborative and interdisciplinary. Innovation capacity needs to be improved in Australian industry so that the fruits of R&D become “sticky” instead of rapidly going overseas.

- The level of spending on public sector research does not necessarily guarantee a nation’s pre-eminence in innovation and rhetoric on all sides should acknowledge the importance of innovation as a determinant of national productivity and foster policies to maximise it.
- Mechanisms should be put in place to capture the benefits of research and to direct research to problems of national importance including the support of those industries providing employment to Australians, especially emergent industries that will generate the next wave of employment.

2. Collaboration as a Key Driver for Knowledge Uptake

It is widely recognised internationally that effective collaboration between PSROs and industry is essential for capturing the innovation dividend. Overseas countries, especially in Europe and Asia, have put in place Government-sponsored programs to promote collaboration and offered grants and rewards to organisations that progress this. By international (OECD) standards the collaboration between public sector research organisations and industry in Australia is poor. Ways to improve the situation are required. It is noted that the Minister has put forward a target of doubling the level of collaboration by 2020. Delegates felt that this was a stretch target which would require significant policy change to attain.

- Australia must raise its level of industry-university collaboration.
- Doubling of the present level by 2020 is seen as an aggressive aim set by Government and will require additional policy initiatives.

3. Australian R&D Culture

Delegates confirmed that there was a gap between industry and PSROs. From an industry viewpoint collaboration with PSROs was hampered by:

- Questions of ownership of intellectual property (IP);
- Often entirely unrealistic valuation of the IP by the PSRO;
- Timeliness of research outcomes;
- Inadequate industry involvement in goal setting; and
- Issues arising from the PSRO’s wish to publish results.

From the PSRO perspective, the absence of any significant financial stimulus or imperative to collaborate was an important barrier. Furthermore, universities in particular emphasise excellence of research in their business planning since, under processes such as ERA, this is a determiner of future government funding. Research excellence also leads to reputational enhancement which attracts fee-paying international students whose tuition fees now make up a significant portion of institutional incomes. Typically, research excellence leads to reputational enhancement which attracts fee-paying international students whose tuition fees now make up a significant portion of institutional incomes.

1 “Innovation Dividend” refers to the return to the national economy by way of productivity improvements as a result of investment in R&D.

2 “Swedish Paradox” refers to the phenomenon prevailing in Sweden where a high investment in R&D has not led to commensurate benefits to the Swedish economy.
universities do not have overt reward systems in place for academics who foster research collaboration. Other factors militating against collaboration include lack of mobility of researchers, insufficient experience by research students of the industrial R&D environment and inadequate support mechanisms (seed funding and venture capital) to take promising research through the “valley of death” to commercialisation.

- Government should, through its Compact Negotiations with universities, actively change their culture towards greater collaboration with business and industry, especially in appropriate disciplines, and to encourage a top-down embrace of collaborative innovation. The Government is encouraged to introduce additional funding, such as third stream funding to reward institutions that are effective in collaboration. UK experience suggests that the level of this funding would need to be three to five percent of total funding to have a significant cultural impact. To this end, the possibility of claw-back and redistribution of institutional income should be contemplated. A framework will need to be developed to assess the quality and magnitude of such collaboration.

- As an alternative, the Government should reconfigure ERA in appropriate disciplinary areas to measure and pay attention to the innovation dividend accruing from publicly funded research, carrying this aspect forward to any ERA-based funding model.

4. KNOWLEDGE UPTAKE BY INDUSTRY

Delegates stressed that it was unrealistic to view industry and its ability to take up knowledge and form viable links with PSROs as homogeneous. Large industrial organisations generally had established mechanisms for this, though with the disappearance of corporate research laboratories (especially those of multinational companies) and the absence of Chief Technologists and the like at the senior executive level, collaboration was more likely to be initiated at operational levels and required a different approach and shorter output time frames than in the past. For SMEs the situation was different. These companies were not necessarily knowledge-receptive and mechanisms needed to be put in place to aid such firms. It was also stressed that the effectiveness of knowledge transfer varied considerably by industry sector. Australia has a particularly poor record of encouraging linkages between PSROs and SMEs. Universities find it time consuming to locate and collaborate with SMEs. Delegates saw benefit in the support of trusted intermediaries that brought parties together.

Important features of collaborative engagement from industry’s perspective are summarised in the following table:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Large company/ multinational</th>
<th>SME</th>
<th>VC/Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key reason for collaborating</td>
<td>Access to world class researchers “research excellence”</td>
<td>Access to applied research and incremental improvements</td>
<td>Technology licensing opportunity</td>
</tr>
<tr>
<td>Key impediments to collaboration</td>
<td>• IP ownership • timeliness of delivery</td>
<td>• IP ownership • Absorptive capacity • Relationship management effort • Lack of recognition of the potential value and relevance of university collaboration</td>
<td>• IP ownership • Time to manage relationship • Insufficient funding</td>
</tr>
<tr>
<td>Relative importance of TTO in facilitating collaboration, and its function</td>
<td>Low</td>
<td>Moderate • Who to talk to • How to connect</td>
<td>High • What is possible • What is available</td>
</tr>
<tr>
<td>Timeframe and deliverables</td>
<td>Short/medium/long • Research bodies of work</td>
<td>Short/medium • Actionable outcomes</td>
<td>Short (payback hurdle) • Prototypes ready for scale-up</td>
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5. EXISTING GOVERNMENT PROGRAMS

Delegates were generally disappointed by the discontinuance of the Commercial Ready program. Regarding other programs they commented:

- **Commercialisation Australia**: The components of this program are considered useful but its scope and financial commitment are considered too limited at present.

- **R&D Tax Credit**: Not yet passed by Senate but seen as potentially beneficial for SMEs. Jury is out on whether it will lead to a decline in R&D activity by large firms.

- **CRC Scheme**: Lowering of funding in the 2011 Budget seen as a negative in what has been a useful scheme in promoting collaboration. Chance of success is too low to excite industry to be involved. Administratively cumbersome.

- **ARC Linkage Grant Scheme**: Seen as currently too focused on the academic side of the house. Application and decision processes take far too long. Industrial partners frequently insufficiently involved in setting goals for managing research projects. The burden of finding matching funding is sometimes a significant problem for SMEs.

- **Venture Capital Schemes**: No new funding has been provided by Government and existing VC firms are reaching the end of their lives.

- **Joint Research Engagement Scheme**: This scheme has replaced the Institutional Grants Scheme for the block allocation of research funding to universities. A feature of the new scheme is its comparatively greater weighting for research income in the “Industry and Other” category. From the viewpoint of promoting collaboration this is a positive step.

- **Enterprise Connect**: This and its embedded schemes assist SMEs in sourcing expert help in technology

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2 Subsequent to the Workshop the Minister has announced three more licences for VC firms, one of which is for a new manager with a $165M fund. The May Budget also announced a further $60M for a green energy VC.
and general business matters. One embodiment is the Researchers in Business scheme which allows the placement of PSRO researchers in a firm for 2-12 months. While this program is supported by delegates, it is less generous in terms of required company contribution and less extensive in application than equivalent schemes overseas, notably the Knowledge Transfer Partnerships program in the UK and similar schemes in Europe. There the focus is on the development and implementation of collaborations in the absence of the ability of companies to do so unaided.

State-Based Schemes: Delegates were strongly supportive of the NSW Voucher Scheme for SMEs and the TechFast schemes of Queensland and SA. Extension to the national level and significant enhancement were considered desirable. However, it was noted that the funding provided under these schemes is relatively small and does not provide for substantial R&D – at best that for proof-of-concept demonstration (QLD).

Previous Schemes: Delegates noted that earlier grants under AusIndustry had a specific category for Collaborative Grants. These were effective as the commercial partner applied for the grant and sought an academic research group with the right skills. The commercial partner was the project manager. Industry delegates felt that this particular scheme had functioned well and was responsible for some notable Australian technology success stories.

Excellence in Research Australia (ERA): Delegates acknowledged the importance of research excellence in PSROs. But there was a general feeling that, in ignoring the innovation dividend (commercial outcome or impact) of PSRO research, ERA sends a signal to researchers that the key consideration is one of publishing in “top” (high citation) journals rather than seeking to collaborate with the private sector for national benefit. It may well be that the Government sees the present ERA process as the first step along the way of stimulating an innovative Australian economy. Step two is to log and reward beneficial researcher-industry collaborations to encourage good research and inventions to be transformed into innovations that have commercial benefit (as is currently being done in the UK). If this is so, the Government would be well advised to publicly state the importance it attaches to such collaboration. Also delegates recognised that collaboration and knowledge transfer may probably be more applicable

- Current Government schemes need to be augmented and supplemented by new schemes if collaboration targets are to be met.

- There is a strong case for a more nimble, more industry-focused Linkage Grant or mini-CRC scheme which has the flexibility of rapid award, variable project length and industry-based research goal setting and management. Maintaining accountability and probity, while reducing the running cost of the scheme would also be useful to explore.

- Government via DIISR should consider a Commonwealth-wide adoption of the (NSW, QLD and SA) voucher system for SMEs to purchase the research expertise of PSROs.

- Certain of the beneficial features of the UK Knowledge Transfer Partnerships (KTP) scheme and the US Small Business Innovative Research (SBIR) scheme could profitably be employed in new or revised Australian funding programs. These include greater involvement of the industry partner in setting the research agenda and the possibility of payment of Government funds direct to firms.

- Government (as in the US) should give preferential allocation of existing government funding programs for industry R&D where there is demonstrable collaboration between industry with PSROs.
to some disciplinary areas than others, although collaboration is often fostered by a multidisciplinary approach. A number of delegates drew attention to the Small Business Innovative Research (SBIR) program in the US which promotes R&D in start-up companies. SBIR grants cover full costs and do not have to be repaid and transfer funds directly to the company.

6. TECHNOLOGY TRANSFER OFFICES

A number of delegates felt that Technology Transfer Offices (TTOs) were as much part of the problem of improving collaboration as an aid in solving it. Within universities, they are considered as cash sinks, as the likelihood of a university obtaining significant income from the commercialisation of its IP is quite small. Within industry, they are often seen as posing a major and undesirable hurdle in building a relationship with a promising academic researcher. Contract negotiations are often prolonged and the transaction cost is high.

While there is one view that TTOs should be supported directly by Government funding (this is one role for Third Stream Funding in the UK), there was the sense amongst the delegates that greater consistency of approach across TTOs would be beneficial. For example, contracts should be simpler and made more uniform. Those at the Workshop speaking for TTOs indicated that the management of TTOs saw their role as changing towards a greater accent on making industry aware of what was available in the university and providing training for academics and business people in how to bring about efficient collaboration.

- Government in concert with Universities Australia and an industry organisation such as AIRG should explore how the TTOs of Australian universities can be made more effective, both as knowledge transfer agencies and as training grounds in the innovation process. This process could involve proposing amalgamations and providing part funding for TTOs based on university success in collaborative research, effectiveness of training and bringing research through to commercialisation.

- A concerted effort must be made nationally to reduce the transaction costs in developing contracts between industry and PSROs with potential Government support to an organisation like Knowledge Commercialisation Australia to scope and solve the problem through its membership working with industry.

- Government and industry should champion the development of a proof-of-concept metric as an aid to quantifying innovative activity.

- Government should provide in compact negotiations the possibility for some universities to opt out of IP ownership in return for their participation in supported regional Centres of Expertise.

- Government should ensure that industry is deeply involved in the formulation and management of research projects that receive Government funding under programs that support collaboration.

3 Following the Workshop, it has been announced by Minister Carr that journal rankings A*, A, B, C no longer be used by the Research Evaluation Committees in assessing the quality of research. Attention will now be paid to publications in those outlets most commonly used by the particular discipline. The Minister has indicated that this will give greater capacity to ERA to adequately capture applied and interdisciplinary research.

7. MINIMISATION OF CHURN
Delegates felt that the rapid turnover of innovation support programs, often over time frames matching Commonwealth electoral cycles, left many in industry and PSROs disinclined to seek support for useful projects and led to apparent policy inconsistency. The Workshop strongly endorsed the goal of seeking a bipartisan approach to innovation and research collaboration encouragement and noted the possibilities that the NBN provides in terms of collaborative opportunities.

- A policy-stable environment should be developed for innovation-stimulating initiatives in the interests of ensuring a policy continuum to foster long-term collaborative relationships between industry and PSROs and that bipartisan support be developed.

8. ROLE OF ATSE
Delegates held the firm opinion that ATSE should play a key role in advising the Government, industry and the academic world on ways to improve collaboration and lead to an enhancement of Australia’s innovation potential. Value was seen in ATSE functioning like the UK Council for Industry and Higher Education (CIHE) in synthesising and developing policy on, for example, assessment and allocation of research funding, at a high level for submission to government.

- ATSE should offer to take on an advisory role in assisting the Government to improve the level of collaboration between industry and PSROs.

For further information on the workshop program and delegates visit International Programs on the ATSE website www.atse.org.au/atse-in-action/thinking-globally/international-program