



Date: August 15, 2003

National Research Infrastructure Taskforce
Department of Education, Science and Training
Location 121
GPO Box 9880
CANBERRA ACT 2601

Dear Sir/Madam,

The Australian Institute for Commercialisation (AIC) is a national, not-for-profit company that delivers programs to improve the commercialisation of Australia's research investment. We believe that our stakeholder representation, the quality of our management, board and advisors, the linkages we have developed with other organisations nationally and internationally, and the research that we have pursued, enables us to provide effective policy input and commentary on world's best practice in commercialisation. Coupled with our operational programs, our goal is to bring improved economic benefits by commercialisation of Australia's research.

The AIC appreciates the opportunity to provide comment on the national research infrastructure and in particular, its impact on commercialisation. The focus of our comments will therefore be in this context.

I. Background

At its simplest, "commercialisation" is the transformation of ideas into successful economic outcomes.

These outcomes can range from a new-technology company's profits to significant effects, over time, on a country's GDP.

The commercialisation process is vital to Australia's interest as the benefit from continued macro- and micro-economic reform over the last decade or so diminishes as the reform agenda is completed. Australia's "fast-follower" strategy, importing and applying new technologies, has also resulted in growth, but not relative to other followers. Sustaining higher level GDP growth will require genuine expansion of the economy and increased knowledge intensity, not just doing what we do now more efficiently. Such a "fast-follower plus" strategy will accelerate our growth relative to others by developing new technologies and translating them into commercial opportunities.

Australia is renowned for its excellent research across a variety of disciplines. There are some examples of successful commercialisation of research but we should do better in terms of economic and social returns for Australians. In a report from the Allen Consulting Group recently commissioned by the AIC, the difference between continued improvement in commercialisation performance of research from public research institutions and a levelling off in performance could be worth around \$15 billion in exports by 2020.

The World Economic Forum's Global Competitiveness Report for 2002-2003 warned that greater effort was required by Australia in areas such as innovation and commercialisation. The report's co-author, Professor Scott Stern, noted that Australia's global competitiveness had slipped. Professor Stern wrote the report with world renowned business strategist Professor Michael Porter. The report ranks Australia seventh in a total of 80 nations on its Global Competitiveness Index, two places lower than a year ago. The United States was ranked highest, followed by Finland, Taiwan, Singapore, Sweden and Switzerland. However, Australia ranks only seventeenth in its national innovative capacity, placing it at the bottom of 'second - tier' innovator countries.



Issue 1 – Australia’s Future Research Infrastructure Needs

Comment on Australia’s research infrastructure strengths. Identify where it is adequately resourced and where there are gaps or duplication.

Australia’s research infrastructure strengths lie in its generally good science and its ability to turn input funding into world class research. The weaknesses lie in Australia’s inability to turn this research into commercial returns and the institutions’, particularly regional and smaller universities, ability to commercialise their research. A second weakness is that where a criterion for funding of research includes its commercial potential, there is limited measurement or reporting on commercial returns actually achieved.

In a survey that the AIC recently undertook for the Department of Industry, Tourism and Resources (DITR)¹, the existence of an ‘innovation progression funding gap’ was confirmed. Such a gap could well be explicitly funded by a small percentage of funds presently allocated for research. Other concerns raised in the survey related to gaps in the ‘soft’ infrastructure between institutions and industry, such as the need for specific training to enable entrepreneurs to be efficient business managers, and the need for better access to mentoring networks.

Comment on how developments in enabling technologies, such as information and communications technologies, will affect future research infrastructure needs and opportunities for collaboration.

Fragmentation across the commercialisation environment acts as a barrier to success. This is exacerbated by insufficient engagement between the research and business communities. The “AIC Connect” program provides a platform to establish national and global networks to better coordinate and leverage existing commercialisation activities. It will achieve improved deal flow through economies of scale and bundling of research opportunities.

Within the “AIC Connect” program, the *Aussie Opportunities* website has been developed as a national repository of commercialisable intellectual property, and is being launched to improve the engagement between the research and business communities. This web-enabled database gives researchers, project managers and developers a means to showcase their research and technology projects to potential partners. Website users can include other researchers and project managers, strategic or joint venture partners, and investors. It is the only system in Australia that specifically targets potential partners and investors, both nationally and globally, for their involvement in Australia’s early stage research projects. It has the potential to be used to encourage private co-funding of research projects already supported by public monies.

Issue 2 – The Commonwealth’s Research Infrastructure Funding System

Comment on the strengths and weaknesses of the current funding system for major research infrastructure and how it can be improved. Identify by unintended consequences of the funding system.

One of the selection criteria for some portion of competitive funding should be its commercialisation potential. Researchers who recognise market pull and applications of their research should be encouraged. Provision of mentoring and commercial management expertise would then be mandatory milestones in such a funding process.

Furthermore, there is inadequate focus on the measurement and analysis of the **outcomes** of research. A process that cannot be measured cannot be managed. Armed with improved information and assessment tools, government can better formulate public policy and allocate funding in the priority areas. Current measures of performance relate to “dollars in”, staff numbers, and publications, rather than economic

¹ DITR requested the AIC to extend a previous survey by DITR with companies who have been awarded funding through the Commercialising Emerging Technologies (COMET) program. The AIC extended this survey to two groups: investors and “non-COMET” companies.

outcome measures such as patents, jobs created, and wealth built. To encourage better commercialisation, a better audit trail to measure research outcomes is required as a part of the competitive grants process.

Issue 3 – The Acquisition, Development and Operation of Research Infrastructure

Comment on how collaboration, including Commonwealth and State/Territory collaboration and collaboration with industry, could be improved in planning for and acquiring major research infrastructure.

Finland has earned a reputation as one of the leading innovator nations. The Finnish experience in the construction of buildings to house industry in clusters physically located around their university infrastructure, such as in Helsinki, provides a salutary example of how industry and science can be bridged by forced co-location. The Finnish telecommunications and paper and pulp success stories are results of this close collaboration.

Issue 4 – Processes for Domestic Research Infrastructure Collaboration and Access

Comment on current and emerging approaches to domestic collaboration and access for major research infrastructure. Identify their strengths and weaknesses.

Collaboration as a key to successful innovation is supported by Professor Stern² whose model depicts the quality of linkages as one of the four key drivers of national innovative capacity. He claims 'the quality of the connections between a nation's common innovation infrastructure and individual industrial clusters is crucial to innovation. Without strong linkages, upstream scientific and technical advances can actually diffuse to other countries more quickly than they can be exploited at home'. Formal and informal knowledge sharing between firms, and diffusion within them, are part of the network of feedback connections that constitute the innovation system.

The AIC is developing mechanisms to facilitate these linkages through its National Commercialisation Brokerage, its electronic marketplace *Aussieopportunities.com*, and by working with organisations such as the InnovationXchange to encourage better industry-research collaboration. The AIC would be happy to provide further detail on these approaches and illustrate examples of collaboration these efforts have already engendered, even in their early stages.

Identify barriers to and opportunities for domestic collaboration and access across stakeholders. Comment on the role of industry in domestic collaboration and access and how public and industry collaboration can be increased.

The AIC believes that the current gap between science and industry will only be bridged by outreach programs from **both** business **and** the research communities. The willingness to embrace new technology and to engage with the research community is not necessarily a function of size. Rather, it has to do with the leadership and culture within the organisation, the sector in which the business resides and, importantly, the nature and integration of business planning within the organisation.

A business that does not undertake and apply real planning is in effect stating that it is accepting of its *status quo* position. Such an organisation typically sees little value in the need to engage with the R&D community and others to accept and adopt new technologies to attain new goals. The AIC therefore believes that there is a need to re-construct methodologies for good business planning – particularly for high-growth companies in the contemporary global environment. This will lead to a more progressive attitude to engagement with the scientific and research communities. In turn, research institutions need to create an efficient 'front-door' for industry and to consider ways in which key researchers can be seconded to work in industry in order to improve collaboration and to transfer technology. The reverse industry briefings hosted by the Innovation Xchange and the AIC are other ways in which such collaboration is supported.

² J. Gans and S. Stern, "Assessing Australia's Innovative Capacity in the 21st Century"

As well as the above measures, therefore, the AIC wishes to promote a policy that would require universities and, indeed, other publicly funded research organisations to report on and account for:

- their positive impact on business and industry (probably flowing through to community benefits as well); and
- the effective management and use of their intellectual property.

This could be by adding a “third stream” to their charters, included with their traditional teaching and research missions.

Issue 5 – Processes for International Collaboration and access

Comment on the demand for, and arrangements necessary to facilitate, two-way international collaboration and access.

Researchers often have their own established domestic and international networks. However such networks are typically technical and by nature will preclude market criteria and commercial application. The AIC Expatriate program will provide networks of experienced mentors with overseas market connections for start ups, and will assist to establish international channels to market for start ups by using those expatriates. The AIC believes it is essential to “link global, act local”.

In order to achieve international collaboration on commercialisation, the AIC is establishing international linkages to like organizations, such as Global Connect and the Mid-America Commercialisation Corporation (MACC). Global CONNECT is a collection of firms, regional development organizations, university programs, and capital service providers working together to develop international high technology and life science linkages. The network will extend partnering opportunities across national borders, offering globally-minded entrepreneurs and established firms the tools and resources to accelerate the creation of local high-technology and life science enterprises. Based on the number of international members of such networks, it appears the demand for such collaboration and access is high.

In summary, the AIC is appreciative of the opportunity to raise the issues discussed in this submission and would be delighted to discuss these further with you in the necessary detail.

Yours sincerely,



Rowan Gilmore
Chief Executive Officer

Australian Institute for Commercialisation Limited
ABN 70 100 485 407
Brisbane Technology Park, Miles Platting Road
PO Box 4425, Eight Mile Plains, Queensland 4113
Tel +61 7 3853 5225 Fax +61 7 3853 5226
info@ausicom.com www.ausicom.com



**Australian Institute
for Commercialisation**

Working with Australian research
institutions and industry to maximise returns
from research and development investment.

15 August 2003

Hon. Tony Burke
State Development Committee
Parliament House
Macquarie Street
Sydney NSW 2000

Dear Sir,

The Australian Institute for Commercialisation (AIC) is a national, not-for-profit company that delivers programs to improve the commercialisation of Australia's research investment.

The AIC welcomes the opportunity to make this submission as a part of the inquiry process into science and its commercialisation in NSW. In the following submission the AIC outlines the barriers to commercialisation which were the primary drivers of the establishment of the AIC. The submission describes several AIC initiatives which have been designed to remove these barriers and assist the commercialisation of public sector research investments.

The AIC is appreciative of the opportunity to raise the issues discussed in this submission and would be delighted to discuss these further with you.

Yours sincerely,

Dr. Rowan Gilmore
Chief Executive Officer
Australian Institute for Commercialisation

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SUBMISSION - INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW



Australian Institute
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I. Background

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Australia is renowned for its excellent research across a variety of disciplines. There are some examples of successful commercialisation of research but we should do better in terms of economic and social returns for Australians. For instance, the Chief Scientists' goal of creating 200 new high-growth start-up companies over the next five years would ultimately add \$20 billion of new exports to the economy each year.

The World Economic Forum's Global Competitiveness Report for 2002-2003 warned that greater effort was required by Australia in areas such as innovation and commercialisation. The report's co-author, Professor Scott Stern, noted that Australia's global competitiveness had slipped. Professor Stern wrote the report with world renowned business strategist Professor Michael Porter.

The 2002-2003 Global Competitiveness Report ranks Australia seventh in a total of 80 nations on its Global Competitiveness Index, two places lower than a year ago. The United States was ranked highest, followed by Finland, Taiwan, Singapore, Sweden and Switzerland. However, Australia ranks only seventeenth in its national innovative capacity, placing it at the bottom of 'second - tier' innovator countries.

Dr Peter Jonson, the Chairman of the AIC, was appointed by the Premier of Queensland as the Chair of an Advisory Panel to work with the Queensland Government Department of State Development and with the Panel to develop the AIC from concept to operational phase. The Advisory Panel was selected from a range of senior representatives from the commercialisation sector. This panel identified a number of barriers to commercialisation and provided advice on a proposed corporate structure for the AIC. The major barriers identified by the Advisory Panel are listed below and enumerated in more detail in the next section.

1. People and Culture
2. Taxation Issues
3. Education and Training
4. Funds availability
5. Intellectual Property
6. Company - Research Links
7. Obtaining best unbiased advice
8. Appropriate and meaningful benchmarking
9. Co-ordinated exposure to markets (overseas links)

II. Impediments to Commercialisation

These multiple barriers to commercialisation are delineated in more detail below. Many of the comments, by virtue of the complex interactions affecting innovation, will touch multiple categories. The solutions to each barrier will be wide ranging, since innovation and commercialisation form a complex system. Internationally, whole-of-government approaches to innovation policy have been found necessary to improve the commercialisation system.

1. People and Culture

- There is a shortage of appropriate people and processes in the incubation process with the proper skills, including those at the board level.
- There is not a widespread entrepreneurial culture in Australia that celebrates success and accepts the associated failure and risk. Australia has a lack of serial entrepreneurs.
- Training and skills are lacking at all organizational levels within the start-up milieu.
- The environmental factors impacting people, such as the tax system, the lack of venture capital, or a well-understood and well-trod commercialisation process are often not properly set or measured.
- There is a perceived gap between the ethos and timeframes of the academic research environment and the for-profit motive of the business world.
- There is frequently a lack of proper incentives for researchers to manage and commercialise the intellectual property (IP) they create.
- Commercialisation is often seen as the last stage in a sequence of research, rather than research as part of a commercialisation process. Research is frequently performed for its own sake, rather than for a well identified or defined commercial outcome or market. Commercialisation needs to be identified as a key objective in the process (if it is a desired outcome), while still respecting the importance of pure science and academic excellence.

2. Taxation Issues

There are a number of impediments in the current taxation system that work against innovation.

a) R & D grant schemes and tax incentives

- i) Grant eligibility – most government grant schemes to encourage ideas to move from proof-of-concept to a business stage require the applicant to be incorporated. For an unincorporated entity, this generates a number of costs and could be a business strategy that is not necessarily the most appropriate or feasible for its stage of development.
- ii) The R&D cash rebate scheme has two direct effects on new start-up companies:
 - a) it prohibits any tax exempt organization to hold greater than 25% ownership to be eligible; and
 - b) it requires a 3 year financial history to be eligible – start-up companies have cash flow issues.
- iii) Many research institutions are tax exempt, and thus ineligible to apply for tax exemptions, and for many other government grant schemes.

b) Employee share option schemes

Employee Share Option Provision Schemes (ESOPs) are commonly utilized by investors to provide incentives and rewards for inventors/staff of start-up companies which do not have the immediate financial resources to make cash incentives available. There is a tax penalty associated with these schemes as soon as the underlying IP is valued, for instance upon initial investment of start-up funds. When this occurs, a tax burden is immediately payable on ownership of company shares. In some cases, an FBT exposure is also incurred by the institution.

c) Stamp Duty

There are stamp duty consequences when IP is transferred or licensed from a research institute to a start-up company. From a stamp duty point of view, the transfer and license of IP is caught under the definition of asset transfer, thus dutiable.

d) Amortisation and IP Valuation

- Tax deductions are available for accelerated depreciation of capital equipment but there is no policy approach for amortization of intangible capital items, such as patents in technology companies.
- There is a need to have guidelines on IP valuation and also to have continuity and security on IP valuation. A proposed solution could be to submit a valuation to the Tax Commissioner seeking a once-and-for-all confirmation of the valuation of the IP, for instance, as at the date of creation of a start-up company.

e) Encouraging investment in new innovation

- R&D Tax concessions are not stimulating this sector enough – R&D expenditure in the private sector (individuals and corporations) needs to be stimulated to increase their activity
- Investment needs to be encouraged for the longer term. Investment from private individuals (i.e. angel investors) should be allowable as an upfront tax deduction. Rollover relief of capital gains realised from a mature start-up company into new start-up companies is also provided in some overseas countries.
- During July 2002, a number of tax concessions were set introduced in the Tax Act and VC Act. However they are primarily directed towards attracting overseas capital into Australia.

f) Company transition

- In the early stages of developing a concept, IP may be held in a company structure convenient for the research institution, while in later stages it is important that the company structure matches markets and channels. For instance, when a company lists on the US-based NASDAQ exchange, the company realises a capital gain and is assessed tax in Australia. The result is that many companies are being lost offshore too early, along with economic and social benefits to Australia. Taxation incentives need to be structured to encourage this.

3. Education and Training

- There is often a negative public perception of researchers participating in the returns from commercialised research, particularly those on the government payroll.
- There is a shortage of start-up management skills and commercialisation skills in Australia.
- There appear to be 'disconnects' - be it in language, overall philosophy, time frames or priorities for key deliverables between many researchers and their institutions on the one hand, and venture capitalists and the market generally on the other.

4. Funds Availability

- There are many researchers who believe that there is a shortage of start-up resources in Australia. Surveys show there is an 'innovation progression gap' for funding for very early stage ideas.
- There are many venture capitalists who believe that there is a great deal of commercially irrelevant research conducted in public institutions.
- Businesses and SMEs are often ignorant of the research directions of Australian universities and are frequently more focused on cutting costs than growing through innovation.

5. Intellectual Property

- The rights to ownership of patents need to be coupled with the assumption of responsibility for the effective identification, protection, management and commercialisation of the invention.

- At present, too much IP is lost through delay, through dilution, through ignorance of its potential, or through lack of knowledge of what IP exists within an organisation.

6. Company-research Links

- Commercialisation efforts are fragmented, with larger universities and CRCs having units dedicated to commercialisation while many have none or only one-man bands.
- A greater level of international networking and marketing of commercialisation needs to be fostered within Australia.
- There is an issue of scale with respect to the likely size a spin-off can reach in Australia compared to the US or Europe. Following from this is the need for any really successful spin-off to pursue both markets and funding offshore.
- There are high transaction costs in Australia partly attributable to reinventing the commercialisation process repeatedly. Rather than sharing of experiences in starting new ventures, each spin-off will frequently repeat the same mistakes of others. The associated cost drains significant financial resources at critical early stages. These costs often include expensive professional fees for advisors.
- Multinationals undertaking R&D in Australia will often do so only for reasons of subsidy, and will withdraw to their home base in difficult economic times.

7. Best Unbiased Advice

- There is a very real difficulty for researchers to obtain “hard nosed, accurate, confidential, unbiased advice and subsequent support” for commercialisation activities, especially in smaller institutions.
- There are problems for new companies in obtaining suitably qualified, competent and trusted advisors and directors.

8. Appropriate and Meaningful Benchmarking

- Commercialisation processes need to be assessed objectively against international “best practice”. Any blocking issues identified throughout the commercialisation processes need to be removed.
- There needs to be recognition that there is not a “one size fits all” solution to the commercialisation process – processes that are successful overseas need to be adapted for Australia, there will be differences in different industries
- There is a lack of good news stories – the same stories are being retold repeatedly. There is a very real need to identify ways to promote a broader range and larger number of these stories through the media, especially television.

9. Co-ordinated Exposure to Markets (overseas links)

- There is currently too much fragmentation of research - be it because of the number of research institutions operating in similar fields or because of rivalries for available funding and difficulties in securing industry partners. Greater coordination is needed between them to allow bundling of related intellectual property to ensure marketable outcomes. Within Australia, there are 94 research institutions with research budgets under \$20M.

- Closer links with overseas companies and distribution channels are required - as an access option to larger markets.

III. The AIC response

The AIC has undertaken consultation and research in the commercialisation arena, and has identified a number of recommendations to improve Australia's innovative position. The AIC hopes to raise awareness of what can be done through its education programs, policy influence, and our greater involvement in bodies and events promoting the importance of innovation and entrepreneurship. Furthermore, the AIC is actively involved in delivering services to the commercialisation sector to assist its stakeholder in achieving successful outcomes.

The AIC is focused on six key policy areas which are summarised below.

Innovation policy The AIC views innovation holistically as a contributor to national competitiveness and economic growth – this means focussing on more than public sector R&D and education efforts. National innovation policy must support the development of an environment that encourages market exploitation of innovation. The AIC perspective is based on Professors Porter and Stern's work on the National Innovative Capacity Framework, and examines both public and private sector contributions to the economy. Examination of Australia's economic performance indicates that unless a shift is made to encourage new emerging growth industries, to support clusters, and to improve our nation's 'innovative stock', Australia as a nation will be unable to sustain its current level of economic and productivity growth.

Industry-science relationships A key element of all successful innovation based economies and sustainable economic growth is high quality linkages between industry and science. This is a major weakness in Australia's innovation system at present and needs attention from both the public and private sectors. The AIC has developed mechanisms to facilitate these linkages through the proposed AIC Commercialisation Brokerage, AIC expatriate network, our e-market AussieOpportunities.com, and through working with organisations such as the InnovationXchange to encourage industry involvement.

IP management A major impediment to technology-based innovation is proper management of IP. Clear ownership and exploitation rights are needed if IP is to be successfully commercialised. As the first stage in its policy campaign, the AIC is championing the need for public sector boards to be accountable for IP held by their institutions. This encouragement to identify IP makes it more likely that IP portfolios can be exploited.

Taxation is seen as a significant barrier to commercialisation by the AIC, and this view is shared by a number of other stakeholders who have focussed in detail on this issue. Of particular interest are taxation disincentives for risk sharing in start-up ventures, such as equity packages, and the concern of expatriates who see the tax system as a barrier to returning.

Metrics Current measures of innovation and commercialisation are based around indicators of input such as expenditure rather than outcomes of investment, such as jobs and wealth creation. The fact that many of these measures are collected on an ad-hoc basis makes it difficult for a coherent national approach to innovation policy. The AIC is collecting, analysing, and providing information on outcomes in the innovation system, to improve resource allocation and encourage a longer term strategic approach to innovation.

People and culture Any innovation based economy is using the knowledge of its people to grow. This is the resource that has the highest premium. Despite its pioneering beginnings and early inventiveness, Australia is often recognised as having a risk averse culture. Measures to address this and provide the skills base needed for effective commercialisation have been built into the AIC programs. This is an underlying theme rather than an issue that can be dealt with in isolation.

The AIC would be happy to provide detailed copies of its policy recommendations in these areas to the Committee, upon request.

IV. AIC operational programs

The AIC services that are driven by the AIC's position in each of these areas are known as AIC Connect, AIC Know How, and AIC Assess. These programs relate to the lack of coordination, skills and analysis in the commercialisation sector. They seek to add value by working with State and Federal Governments to address barriers to commercialisation. Their focus is in three key areas:

Firstly, fragmentation across the commercialisation environment acts as a barrier to success. This is often exacerbated by insufficient engagement between the research and business communities. The "AIC Connect" program provides a platform to establish national and global networks to better coordinate and leverage existing commercialisation activities. It will achieve improved deal flow through economies of scale and bundling of research opportunities.

For example, the proposed AIC expatriate/mentoring program is a part of the *AIC Connect* initiative. This program intends to develop networks of experienced mentors with overseas market connections for start-ups, and to establish international channels to market for start-ups by using advice from those expatriates with links to Australia and the program, but who still remain abroad.

Secondly, Australia does not have a depth of commercialisation management experience in start-up companies born from R&D. "AIC Know-How" programs partner with universities and industry to deliver professional development courses and create an improved pool of knowledge on commercialisation practices. The purpose is to improve commercialisation management skills and to act as a catalyst for the business schools to teach the skills needed to manage start-up companies.

Specifically, in regards to the need to increase awareness of the importance of innovation and commercialisation, the AIC offers, through its "AIC Know-How" program, a number of educational short-courses in conjunction with several universities, as well as a commercialisation library, AIC intern program, best practice guides, and a series of 'Commercialise 2003' workshops.

Thirdly, there is inadequate measurement and analysis of commercialisation activities. What cannot be measured cannot be managed. Armed with improved information and assessment tools, industry can better allocate resources and government can better formulate public policy. "AIC Assess" undertakes collaborative research to facilitate improved decision making.

Under the "AIC Assess" program the AIC is conducting a number of activities to address gaps in the measurement of innovation and its benefits to the economy. For instance, we are measuring the commercialisation outcomes of Australia's universities and CRC's on behalf of the Federal Department of Education, Science, and Training, and the typical funding gap of small start-up companies for the Federal Department of Industry, Tourism, and Resources.

Some of these programs are still in the developmental stage and require further funding at both the state and federal level to be fully implemented. It is the AIC's goal to catalyze the stakeholders in the commercialisation process so that market failures can be rectified and our programs become self-funding within the medium term. We seek the involvement of the NSW Government in the development, seed funding, and delivery of those parts of these programs that are still in the planning stages.

In particular, the need for improving industry-science linkages, sharing of best practice, and for addressing early market failure are being addressed by the AIC as part of the rationale behind its proposed Commercialisation Brokerage service. This is a key initiative of the "AIC Connect" program and is being developed to assist public research institutions, primarily regional and smaller institutions, to identify the most promising research opportunities with commercial potential, and to undertake the necessary work to reach proof-of-concept and deal viability stage. We have considerable interest from a number of state governments in this proposal already, and seek the involvement of, the State Government of NSW in this initiative as well.