
**Australian Institute for Commercialisation**

# Submission to the Smart State Strategy

***Research, Development, and Commercialisation***
***Building on our Existing Industries and Infrastructure***

**November 2004**

AIC Australian Institute for Commercialisation

# EXECUTIVE SUMMARY

The challenge for Queensland industry to remain globally competitive over the next decade demands the innovative development and application of leading edge technology to derive new products, processes, and services.

Overseas experience has shown that even cities and states with the most developed facilities can fail to exploit opportunities presented to them, because they lack creative capital and connectivity – so called 'soft infrastructure'. The most pressing priority for Queensland now is to facilitate the development of this infrastructure.

In the AIC's view, future directions of the 'Smart State' strategy should therefore:

- Create a culture where industry and business recognise the value of innovation;
- Ensure that all Queensland universities and research institutions recognise 'industry' as a customer;
- Continue support for local clusters, be specific about sectors, and promote interaction within the system;
- Promote mobility and enable exchanges of staff between government labs, universities, and industry;
- Nurture the growth of investment capital in innovation.

In particular, we wish to highlight the 'Third Stream' concept for universities on the supply side, and the TechFast pilot for SMEs on the demand side, as particularly important initiatives that could be pursued or expanded, in line with the directions above.

This submission relates specifically to exploiting and building on the ideas and research generated by a 'Smart State' for economic, social, and sustainable outcomes – the commercialisation process.

## THE BACKGROUND MOTIVATION

At its simplest, "commercialisation" is the transformation of ideas into successful economic or social outcomes that meet a market need. 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. A 'follower' strategy of importing and applying new technologies has resulted in both growth and productivity improvements, but not relative to other followers. Sustaining high level GDP growth requires genuine expansion of the economy, not just achieving gains solely from efficiency improvements and providing market access to imported technologies. A strategy based on innovation can 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. This can contribute significantly to economic and social returns for all Australians. For example, growth in business R&D has driven around one-quarter of economic growth and around two-fifths of growth in per capita real incomes across Queensland and WA over the period 1985-86 to 1999-2000[1] . Improvements in the adoption of research outcomes by business will drive growth nationwide. For instance, the Chief Scientists' goal of creating 200 new high-growth start-up companies over the next five years could ultimately add $20 billion of new exports to the economy each year by 2020. The 'Smart State' strategy can position Queensland at the forefront of that effort.

Therefore, the challenge for Queensland industry to remain globally competitive over the next decade demands the innovative development and application of leading edge technology to derive new products, processes, and services.

[1] Queensland Treasury, Drivers of Economic Growth Project, 'Productivity and Regional Economic Performance in Australia', 2003.

## KEY CHALLENGES IN COMMERCIALISATION

In spite of strong public funding of R&D and recognition of the importance of excellence in research, commercialisation remains an immature science. Although 'best practice' in the component parts of commercialisation can be found in various pockets throughout Australia, the methodology has still not been widely adopted, and the soft infrastructure necessary for simpler and more widespread adoption of new research by industry is simply sub-scale and probably lacking direction. Aggregation and attaining critical mass is essential in the Australian context, together with broader private sector involvement.

At its most basic, the difficulty in commercialisation can ultimately be reduced to two simple issues: resourcing (effectively money) and people. Skills in commercialisation and in management practice are not innate, and need to be learned. For instance, investment proposals from researchers are frequently of insufficient quality to convince the financial community that the potential reward justifies the risk. Deal flow is stifled by proposals that miss the investment criteria of the venture capital community, who in turn are perceived to be risk averse. In addition, the creative ability of people needs to be nurtured by appropriate individual, corporate, and government incentives, in the form of structures that recognise efforts at commercialisation, provide the agility to do so, and in appropriate tax concessions to encourage risk taking. Likewise, the boards of businesses need to play a more active role in leading innovation and investment for growth.

These issues in resourcing and people exist on both the *supply* side and *demand* sides of the innovation process. The supply of ideas is dependent on a continuing supply of outstanding, innovative research; on well structured research institutions that facilitate the management of IP and the incubation of good ideas; and the soft infrastructure and proximate networks that enable interested stakeholders to collaborate and interact effectively. However, those most in need of innovation may not even recognise that they need it. The demand for innovation needs to be championed by industry, and that requires balanced boards of directors with sound technological judgement; skilled managers receptive to incorporating and managing new technologies within their business models; and sensible targeted funding for project and new product development.

These challenges must be addressed by research organisations, industry, and governments.

## AIC'S EXISTING FOCUS IN COMMERCIALISATION

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

The AIC's role within this broader innovation process is to improve the way in which the potentially valuable research undertaken within public institutions can be successfully transformed into commercial opportunities. The AIC's activity areas address some of these issues surrounding people and resources on both the supply (research organization) and demand (industry) side of the commercialisation process.

In particular, we address these issues across three major thematic areas: collaboration, skills, and the environment surrounding the commercialisation process.

*Firstly*, fragmentation across the commercialisation environment acts as a barrier to success. The "*AIC Connect*" program provides a platform to better engage the research community with industry, and to provide tools, opportunities, and networks to assist researchers communicate an investible proposition. TechFast is one example of an AIC project to bring together SMEs with research institutions. *Secondly*, "*AIC Know-How*" programs partner with universities and industry to deliver professional development courses and create an improved pool of knowledge around commercialisation practices. The purpose is to improve commercialisation management skills and provide tools to increase accessibility to this knowledge. Our Commercialisation Bootcamp for researchers and the AIC Gateway are examples of knowledge-transferring projects. *Thirdly*, "*AIC Assess*" focuses on the metrics of commercialisation and undertakes benchmarking and collaborative research to facilitate improved decision and policy making. The AIC survey on Australia's research commercialisation performance conducted for DEST is an example of such a project.

However, the challenges surrounding the people and resourcing issues in research, development, and commercialisation are broader than any single organization can tackle alone, and there are numerous activities in which Governments can play a broader, facilitative role. These are described in more detail below.

## REVIEW OF SOME DRIVERS OF INNOVATION

However, before we suggest some possible future directions and specific initiatives, it is helpful to first review some literature and recent AIC research on the key drivers of innovation, and thence economic growth.

Referring to Porter's model of innovative capacity, Stern[2] states that the quality of linkages is a key driver for future competitiveness. 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'. A variety of formal and informal organisations and networks – so-called "institutions for collaboration" – are present in many nations and link the two areas. Formal and informal knowledge sharing between firms, and diffusion within them, are part of the network of feedback connections that constitute the innovation system.

Erskine[3] refers to an OECD report that suggests 'the overall innovation performance of an economy depends not so much on how specific formal institutions perform, but on how they interact with each other as elements of a collective system of knowledge creation and use, and on their interplay with social institutions (culture, etc)'. He lists ten related OECD policy recommendations:

- *Giving greater priority to basic and long-term mission-oriented research in public programs*
- *Ensuring appropriate frameworks for intellectual property rights*
- *Matching the supply and demand of scientific knowledge*
- *Improving the governance of universities and public laboratories*
- *Safeguarding public knowledge*
- *Promoting the participation of smaller firms*
- *Attracting, retaining and mobilising human resources*
- *Improving the evaluation of research*
- *Responding to globalisation*
- *Building on existing innovative networks and clusters*

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

[3] Erskinomics Consulting "Critical Factors in Successful R&D – An International Comparison", p. 17, www.ausicom.com

Erskine also notes that 'the technocratic, supply-driven nature of attempts to exploit academic output in Sweden has been markedly less successful than the demand-driven market institutions in the US'. ie. priorities that are set by the market lead to better commercialisation outputs. He also points to the success of Finnish policies in which 'the main benefits lie in the close cooperation between research institutes and industry, the widespread involvement of small and medium sized companies, and the high level of international cooperation'. On Israel, he comments 'our analysis suggests that cluster effects have been particularly useful in overcoming difficulties that Israeli firms faced in accessing markets, because of distance from final markets'.

In a similar vein, the model of innovation used by UCSD Connect, an organisation instrumental in achieving local economic development in San Diego, contains five components:

- *intellectual capital (research, patents, and creation of ideas),*
- *human capital (a talented workforce, skills),*
- *financial capital (venture capital and funding),*
- *clusters (concentration, critical mass), and*
- *creative capital (regional mindset, collaboration, connectivity).*

For innovation to occur, according to this model a community requires more than hard assets - people, science, and technology, but also soft assets - the power of a network. Stakeholders recognise that *deal flow results from knowing people* and that *business is relational as well as transactional*. The Connect experience has shown that without such relationships, incubator schemes and grant schemes will never completely achieve their desired outcomes of (sustainably) facilitating investment and helping small companies create job growth and wealth. The premise for this is that the ***relational* component of economic development (i.e. trust) becomes much more important as the risk increases**. This is clearly the case in the growth of untested, hi-tech, start up companies.

The AIC believes that a future strategy for the Smart State should be to bring greater focus to the 'soft assets', and to continue to build on the hard assets that exist within the State to varying degrees already.

# SUGGESTED FUTURE DIRECTIONS

## (i) Create a culture where industry and business recognise the value of innovation

Willingness to embrace new or 'smart' technology and to engage with the research community is not necessarily a function of size. Indeed, Australia's top 50 firms have minimal representation on IPRIA's list of Australia's most innovative companies[4]. Rather, capability to embrace innovation is a reflection of the leadership and culture within an 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, or is a reactive organisation. Such an organisation typically sees little value in the need to engage with either the R&D community or others to accept and adopt new technologies to attain new goals.

The AIC believes that Smart State companies will become smart when they adopt 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.

The State Government can support such efforts at cultural change through various initiatives:

- Review the funding targeted at industry to ensure it promotes sustainable high technology companies, and is sensibly targeted. There is an enormous plethora of schemes today across all tiers of government, some with mixed results. Target funding for the future should be based on a consideration of the effort to date; what works, what doesn't. Application of the State's research goals will help here.
- Celebrate innovation heroes and local firms. There are many excellent examples of industries engaging with the R&D community, and benefiting. These peer examples need to be better recognized, highlighted and celebrated and the generic lessons documented and circulated.
- The AIC is particularly excited about the promise of its TechFast program, first piloted in Queensland and about to be piloted nationally. TechFast works with technologically receptive SMEs to identify publicly-funded R&D from across Australia, and assists in its transfer, to help the SMEs become stronger and more innovative businesses.

[4] Intellectual Property Research Institute of Australia, "R&D and Intellectual Property Scoreboard 2004".

- The importance of innovation can be highlighted and branded both within government itself, and through government focus on the application of new technology. Government purchasing initiatives can be used as a tool.
- The need for 'balanced boards' capable of exercising sound technological judgment is particularly acute in Australia compared with many US and European countries. Organizations such as the AICD and BCA should be encouraged to focus on such activity.
- Work with the Queensland universities to develop programs that grow the cadre of new technology commercialising executives, entrepreneurs and company directors, and encourage interaction of this group with science and engineering students.

### (ii) Ensure that all Queensland universities and research institutions recognise 'industry' as a customer

Successful commercialisation requires both the supply of ideas and talent, and demand from markets, through industry, to deliver useful products and services. There is a tendency in commercialisation of research to focus on the supply side alone, and to assume that the supply adjusts itself to meet demand. That adjustment process can be quite inefficient and wasteful.

One key to success in regional development is developing a world-class people climate. Universities are very effective talent-attractors. Richard Florida[5] opines that for universities to be effective contributors to regional growth, a university must play roles that reflect the three 'T's' of creative places – technology, talent, and tolerance. The Irish 'miracle' was premised upon the three Ts; today, sixty percent of Ireland's university students major in engineering, science, or business studies. In Ireland, the recruiting of technology companies and entrepreneurs was extended to the artistic and cultural creative scene of writers, and musicians (U2, Van Morrison, etc). Place is becoming an important source of status. The 'Smart State' could be such a 'place'.

A range of supply side initiatives could include:

- Task and appropriately fund universities to adopt an explicit 'third' stream – support for industry – in their mission statement. The UK's 'third stream' of funding accompanied a requirement for universities to adopt a third mission – that of serving industry. This has been considered in the UK's Lambert review of university commercialisation, and is a legislative recommendation in the recent AVCC-BCA review of research commercialisation[6]. From our vantage point, Queensland's universities are already among the most collaborative of Australian

[5] R. Florida, 'The Rise of the Creative Class', Basic Books, New York, 2002
[6] Australian Vice-Chancellors' Committee and Business Council of Australia, "Building Effective Systems for the Commercialisation of University Research", August 2004, p70

universities, and UQ in particular leads the field in commercialisation of university research. Entrenching a commitment to collaboration with industry in the charter of the State's universities, and providing access to a pool of funding, would give them the official mandate to enable them to even more vigorously pursue outcomes from their research.

- Anchor a 'creative class' around universities. The Creative Industries Precinct is an excellent initiative that can help achieve this in its sector. We note that part of the reason for the success of San Diego in attracting high-growth, high wage jobs has been the success of UCSD in 'anchoring' creative activity around the university. Attracting venture capital and industry to the university's talent pool has created a plethora of businesses, particularly in the biotech and wireless areas. Their growth was sparked by one or two iconic leaders in these fields. Queensland universities also have iconic researchers in a number of fields, but these potential leaders are often lost within the research community. Their talents could be better utilised if cross-coupled with entrepreneurs.
- A timely opportunity exists to encourage the three Brisbane universities to pool or share their commercialisation skills and create portfolios of IP to take to market. Again, the instilling of contemporary business planning and quality governance are essential elements in such enterprises.
- Implement metrics for State-supported research institutions around the supply of ideas and their support for industry that can help benchmark their outcomes and improve the transfer of R&D and its conversion process. There is too much emphasis placed on the number of spin-out companies created from commercialisation activity. Whilst this is indicative of short-term activity, it does not necessarily reflect longer term wealth generation and value creation, attraction of capital, or job creation. Outcome indicators have considerable lag with respect to inputs, so must be considered over time. The metrics should report on:
    - *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.*

### (iii) Continue support for local clusters, be specific about sectors, and promote interaction

In deciding how to develop communities of interest, the AIC believes that, as with clusters and supply chains of any sort, the best are developed with true commonality of interest and with physical immediacy. Proximity matters. Localisation promotes fluidity of ideas, the very food for a knowledge ecosystem. For that reason, policies which bring together industry and science should, for the most part, be locally or regionally based, identifying opportunities that mean something to both those research institutions and to local businesses and, in effect, put a leading edge to comparative advantages that already exist in those regions.

Rowen and Toyoda have identified six major enabling factors that would have improved the emergence of high tech startup companies in Japan[7], especially when compared with the US and Taiwan:

- appropriate 'rules' of the game, that help establish the background for entrepreneurial activity (labor mobility, compensation, regulatory constraints, etc.);
- creation of high knowledge intensity and *knowledge-sharing* environments;
- high value placed on merit
- a social climate that rewards rather than punishes risk taking
- cooperative institutional relations among business, academe, and government that encourage knowledge transfer; and
- an infrastructure and environment that nurtures newly emerging firms, especially in finance.
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Seline[8] from New Economy Strategies Inc. gives the example of San Diego and the greater Philadelphia area (December 2003). San Diego receives about $1B of Federal R&D funding each year, Philadelphia $1.8B. Both have world-class universities (the latter including Princeton) and research institutions. Philadelphia has much more 'old capital' than San Diego. Both cities have enormous assets, yet San Diego produces over one hundred new biotech companies each year against Philadelphia's ten.

Numerous other examples abound.[9] Both Pittsburgh (home to arguably the world's best university for software engineering, Carnegie-Mellon) and New Jersey (Bell Labs) are similar locations unable to create more than handfuls of new startups each year.

The difference lies very much in the 'soft infrastructure' and the resultant emergence of clusters. In numerous interviews into the direction of research and the membership of boards and peer review committees, leaders in Philadelphia did not understand their role in innovation, and researchers were unaware of what others in their city were doing. The *creative capital*[10] and *proximity* in Philadelphia were significantly less than in San Diego, whose environment facilitated business creation. Philadelphia lacked a creative

[7] H. S. Rowen and A. Toyoda 'From Keiretsu to Startups: Japan's Push for High tech Entrepreneurship, Stanford University, October 2002
[8] R. Seline, Private communication, Dec 2003
[9] C. Lee et al, "The Silicon Valley Edge", Stanford Business Books, 2000
[10] The role of social capital in economic development is also of interest. For instance, the Vietnamese community in Houston represents a $1.8B 'banking system'; Indonesia's Chinese population is just 3% of the total but represents 83% of GDP; and the first generation Asian network in the US has become critical to new wealth creation.

class.[11] As Richard Florida points out in 'The Rise of Creative Class', the key to success today in regional development lies in developing a world-class 'people climate'. Cultural inertia can be a real barrier in older, better established, industrial regions. Social capital – regional mindset, collaboration, and connectivity have thrived in San Diego where they are distinctly lacking in Philadelphia.

### (iv) Promote mobility and enable exchanges of staff between government labs, universities, and industry

A common observation is that very often industry and science fail to truly understand the drivers, imperatives, time frames and even the language of the other group. Initiatives might include:

- Break down these barriers by trialing a robust system of industry/research exchanges that are of value to the business, the research institution and the individual involved. Government research personnel could show the way. Develop appropriate incentive schemes, protect tenure (where applicable), and ensure pension rights are unaffected in order to enable such exchanges.
- As a policy direction, facilitate discussions that enable the transfer of knowledge across the State and regions in a creative and non-threatening way.

### (v) Nurture the growth of investment capital in innovation

The capital markets in Australia are small, and the venture capital markets smaller still. The bulk of venture capital funds are not invested in early-stage commercialisation, but in mergers and acquisitions when companies are at the mature stage, risks lower, and the short-term returns higher.

Specific initiatives to narrow this early-stage funding gap could include:

- Encourage, through legislation or rebates, investment of a small component of superannuation funds into private equity and local innovative companies
- Encourage the growth of local angel investor networks. Queensland is particularly well placed in this regard, as it is a favoured location for high wealth retirees
- Facilitate investments in Queensland high growth, high technology business by business immigrants to Queensland (anecdotal evidence suggests that many immigrants invest instead in local retail outlets because a ready market exists for trading)
- Facilitate successful small businesses created through such initiatives to remain in Queensland and to attract follow on capital so they can

[11] R. Seline points out that other supposed creative centres, such as Seattle and Austin, have not recovered from the dot.com collapse to the extent of San Diego. For instance, Seattle spawned 138 millionaires from Immunex, not one of whom has started a new startup. Their largest medical centre has a commercialisation intensity only one-half that of its San Diego equivalent. The head of Austin's Chamber of Commerce 'does not know' the economic future of Austin.

remain local companies. Anecdotes exist of local high-tech companies ready for growth having to become US-based entities simply to attract a later round of venture capital funding. By selling offshore too early in the development cycle, higher value is not realised locally, and the benefits of local jobs lost.

- Utilise Australian expatriates and alumni to assist Queensland firms in market entry and capital raising. The AIC's Expatriate Connect is an initiative based on this model (but one that currently lacks a sustainable revenue model).

## CONCLUSION

Not all of the issues we recommend fall within the direct control of the Queensland Government. Industry and research organizations must be encouraged to contribute. Engagement with the Commonwealth on a variety of levels is also essential to ensure the motivators are consistently applied across all levels of government. The AIC might prove a useful instrument to assist here, as should full use of forums such as COAG, Ministerial Councils, and Departmental Committees.

Over the past two years, the AIC has engaged with other States and the Commonwealth, and a number of public research institutions, private service providers, and industry, particularly SMEs. We are contributing to building the 'soft infrastructure' described in this submission to improve Australia's research commercialisation performance, and in turn, bring benefits to industry. However, much still remains to be done, both by ourselves and by other stakeholders. We observe that Queensland is a leader among the States in driving innovation, and in its collaborative efforts to ensure buy-in from all sectors of the community. The AIC is very proud to be part of that and to contribute to the 'Smart State'.

# APPENDIX
# THE BARRIERS TO COMMERCIALISATION

The following contains a summary of the barriers to commercialisation that were identified at information sessions held throughout the country when the AIC was first created. Many of the comments, by virtue of the complex interactions affecting innovation, will touch multiple categories. Other comments are 'naïve', but have been kept to capture the sentiment. The solutions to each barrier will be wide ranging, since innovation and commercialisation form a complex ecosystem.

## 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.
- Commercialisation 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.

## 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.
- Formal IP policies are not common, and formal mechanisms for IP management are lacking. This can prevent systematic identification of intrinsic value within a business or government, dilute IP, and retard commercialisation.

## 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.
- 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.
- 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.