



18 September 2015

Mr Ian Blayney MLA
Chair
Legislative Assembly Economics and
Industry Standing Committee
Parliament House
Perth WA 6000

By email: laeisc@parliament.wa.gov.au

Dear Chair,

INQUIRY INTO TECHNOLOGICAL AND SERVICE INNOVATION IN WESTERN AUSTRALIA

Thank you for your letter dated 26 June 2015 inviting a written submission from the Chamber of Commerce and Industry of Western Australia (CCIWA) with regard to the above inquiry. Recent economic analyses have unambiguously demonstrated that innovation systems are complex, agile, evolving, and generally involve robust (but flexible) network linkages that allow corporations and institutions to leverage enhanced capacity, efficiency, and profitability from innovation. As the Committee will no doubt discover during the course of its investigations, there is a variety of technical definitions for the term "innovation". A straightforward, and helpful, one is provided by Deloitte: "Innovation is defined as the activity of creating and capturing value from doing something new."

Australia's innovation performance has been mixed, with some significant achievements, considering the relatively small size of the economy, and some continuing deficiencies. It is clear, however, that innovation is critical to the success of all elements of the Australian economy, including those that are significantly resource-based. In this context, it is concerning that Australia has fallen considerably in the World Economic Forum's Global Competitiveness Index in terms of the set of institutions, policies and other factors that determine a country's level of productivity. Australia's competitiveness ranking has fallen from fifth in 2001-02 to 22nd in 2014-15, with it becoming increasingly difficult for Australia businesses to compete against even other advanced high cost nations in the European Union and North America. Further, while Australia ranks 17th (out of 141) in the Global Innovation Index 2015, the country only achieves a score of 55.22%.

Please find attached CCI's submission to the inquiry. The submission contains sections dealing with the Committee's stated interest in agriculture and food, advanced manufacturing, and resources and energy. In addition, CCI has provided relevant information from preliminary international analysis, intellectual property law, and venture capital. Of course, if CCI can be of any further assistance, please do not hesitate to contact us.

Yours sincerely,

Dale Leggett
Director, Policy
Attach:



CCI Submission to Innovation Inquiry

Attachment



Agriculture and Food

Innovation in the agricultural industry has often occurred when conditions have been the most challenging. Of late, increased labour costs, the importance of scale for comparative advantage and climate change have been key drivers of innovation in this industry.

Agricultural innovation involves farmers making decisions to change aspects of their farm or its management. Sometimes the change is an innovation created by the farmer, but more often the innovation is originally created by another farmer, a business or a researcher. Thus, as with other industries, a key aspect of innovation is the process of learning about, evaluating and (perhaps) adopting innovations from elsewhere.

Adoption of innovations is a learning process, involving farmers generally trialling an innovation before adopting it. The final adoption decision depends on a range of personal, social, cultural and economic factors, as well as on characteristics of the innovation itself. Personal characteristics of the farmer also influence adoption and include factors such as: the farmer's goals, risk aversion, inherent entrepreneurship, networks and access to resources.

There are numerous examples of the benefits that can be gained out of research in the agriculture sector, including the development of new products, services and jobs. Increasing the yield and quality of cereal crops, particularly wheat, has been a remarkable achievement over the past century. As science, technology and innovation were applied to production and genetics, farmers were able to expand production. Continued improvements, even modest gains, are important for the industry. Accordingly, given Western Australia's export focus and potential, research and development (R&D) efforts should be focused on the unique conditions in this state. Efforts to create a long-term and sustainable research funding stream and capacity will be important.

Agricultural related research and improved research structures aimed at improving yield cereals (in particular wheat) will continue to help the sector expand, both in output and range, as well as deal with climate variability. This has already been seen through the embracing genetically modified (GM) technologies.

The use of precision agriculture in large, broad acre cropping operations is becoming a very useful tool to improve productivity and yields. This involves the collection and utilisation of data that is used to enhance decision making for seed planting, fertilizer and pesticide application and timing of harvest. The multiple layers of data can include information from sensors, soil testing, drones, and rainfall gauges as well as the overlay of satellite imaging.

Indeed, this aspect raises a broader issue for the Committee's consideration, one which branches across all levels of innovation. The digitisation of information has been a key driver of innovation globally in recent years. With the rise in data analytics tools and capability within WA and globally, one way government could encourage the acceleration of innovation throughout the State's economy is to make the data it collects available to the market via open data principles. Existing businesses or start up enterprises could then combine this data with their own to generate new insights that drive process or technology innovations that could be used to improve existing operations or individually commercialised.

Over the last two decades, State governments have significantly scaled back their expenditure on agricultural research and development, and largely abandoned their agricultural extension activities. Funding responsibilities for agricultural R&D have been transferred to industry (with matching Commonwealth Government contributions). The increased reliance on industry levies to fund agricultural R&D has led farmers to seriously consider whether their research levies are in fact delivering real benefits, especially in the absence of productivity growth in the sector.

To this end, CCI believes that the Committee should, in order to promote the future efficiency of the grain-related sector, consider recommending a long-term plan to amalgamate the various research entities. This is necessary to ensure that a greater proportion of total research funds can be directed towards research, as opposed to administration. Further, there should be a continued effort to ensure that the compulsory levies paid by Western Australian farmers, and distributed by the national Grains Research and Development Corporation (GRDC), are directed to industry-relevant research.

When it comes to the barrier of financing and commercialization, a key challenge for Western Australian agriculture to 2035 is to secure adequate funding to improve and expand production. Estimates of the investment needs for Australian agriculture through to 2050 vary, though some have put this as high as one trillion dollars.

Capital is needed to acquire new technologies; build infrastructure; improve soil productivity; and to acquire new land. As an example, there has been a growing emphasis upon land conservation and the importance of maintaining healthy soils for cropping. The traditional family farms structure with debt financing may not have the capacity to constantly improve soil productivity and invest in land care to ensure the long-term sustainability of the land. For growth, access to both capital and credit will be a key determinant to success. Measures to control or deter investors or lenders from entering the market, be it through regulation or legislation, will restrict the growth of the industry.

As such, the Committee should hold in mind the importance of encouraging a competitive lending market, and avoiding restrictions on financial providers. In addition, as non-traditional farming structures become more prevalent, regulation and especially taxation need to be revisited so to encourage innovation and investment, and to ensure existing owners are not restricted from expanding and attracting external investment and skills.

As for models of development by which innovation could be encouraged, the Committee may be aware that a recent conference organised by the WA Division of Ag Institute Australia (AIA) addressed the issue of ‘Innovation in Agriculture – Opportunities and Constraints’. During proceedings the WA Minister for Agriculture and Food, the Hon Ken Baston MLC, noted that while innovation in agriculture is crucial to capitalising on opportunities in the sector, a number of constraints remain in the way of farmers.

To encourage technological and service innovation in the agriculture and food industry, there is a need to address the following factors: the regulatory environment; infrastructure requirements; improved extension; training and skills development and improve certainty and efficiency in research funding.

With regard to regulation, one core element for the Committee’s consideration is the question of the banning of GM crops under the *Genetically Modified Crops Free Areas Act 2003* (WA) (GM Act). The State Government is proposing to repeal the GM Act, which would mean that once a crop is

approved by the Commonwealth Office of the Gene Technology Regulator there is no further impediment to growing it in Western Australia.

However, a proposed repeal of the GM Act is not by itself adequate. There needs to be a political consensus formed which not only facilitates the introduction of a variety of GM crops, but ensures that GM research and development work, specific to Western Australian conditions, is conducted in the State. Accordingly, CCI encourages the Committee to recommend that a bi-partisan agreement on GM technology be made which will provide certainty to farmers and facilitate further research and investment into WA's agriculture sector.

Of course, as with all other high-tech industries going through rapid change, agricultural enterprises need access to bandwidth, quality telecommunications and large data sets to fully utilise precision agriculture tools. The June 2015 decision by the Western Australian Government to invest \$23 million in Doppler radar technology to improve weather (and particularly rainfall) information is a positive first step. The use of Royalties for Regions money for this productivity enhancing economic infrastructure investments is a positive development. However, all spending on economic infrastructure, including telecommunication upgrades, should be considered on the basis of rigorous cost-benefit analysis ensuring value for taxpayer funds.

As the use of drones, sensors and automated equipment all have the potential to become widespread by the 2030s, the Committee should consider whether Western Australian statutes are presently adequate to keep pace with technological developments so that new agricultural technologies can be utilised on farms without excessive levels of red tape or delay.

In addition, countries such as New Zealand, Argentina, the United Kingdom (UK) and Ireland are moving to improve extension by the facilitation of peer learning, whether using demonstration or monitor farms, discussion groups or benchmarking. In Australia, the grower groups are increasingly being used in the extension process to provide a valuable link between researchers and growers. Currently peer learning, which is one of the most valuable information sources for farmers, can be risk of being undervalued. More attention and support should be given to extension.

Traditionally, training for agricultural businesses was informal. However, the sector has changed significantly over the past few decades, with more emphasis placed on commercial aspects of the operation. Given the capital intensive business models, general commercial management skills are becoming a necessity, particularly risk management. It is important that our education and training systems keep pace the rapid changes in technology, and that agricultural workers are supported in upskilling to keep pace with technological advancements.

Advanced Manufacturing

Australia's manufacturing industry has received significant attention in recent years with the high-profile plant closures of well-known companies. This has, understandably, engendered debate over the future, and even the existence of, manufacturing in this country.

Despite such doubt, there is, without doubt, a bright future for the WA manufacturing industry. The State has well-established industrial hubs and is a leader in specialised industrial machinery, producing high-tech solutions for the resources and agriculture industries. The state also produces quality, world-renowned food and beverage products, and is home to a large group of Australia's downstream resource processing sectors.

But like many other industries, manufacturing has been under pressure from changes in the global economy as well as other headwinds, including a sustained high dollar, problematic government policy, high costs and a lack of scale. Although less pressing than in the recent past, an ageing workforce and the availability of suitable skilled workers are also issues facing the industry.

These challenges must obviously be addressed if the sector is to leverage the opportunities that exist. Although WA manufacturing will not be able to compete on costs alone, our sector can still compete beyond Australia through a focus on innovation and niche products. Germany and Japan are two prominent examples of where manufacturing is successful despite high wage and cost structures. For the Committee's reference, further information on the specifics of German manufacturing is provided later in this submission.

Regardless, while it is ultimately the private sector that will determine manufacturing's future in Western Australia, government should create the best environment to foster industry success. Rather than excessive interference, government should look to create a policy environment that encourages entrepreneurship and innovation, and ensures that businesses have the flexibility to respond to changing market conditions and customer demands.

CCI has set out a plan in its publication *The future of manufacturing: A vision for WA*, to maximise the continued success of the State's manufacturing sector. This policy agenda describes a range of reforms that will remove the barriers to innovation and growth, alleviate the high cost of doing business, and allow businesses to become more deeply integrated into the global economy.

Innovation through R&D, as well as process innovation, will become pivotal in the way WA manufacturers compete in a global market. There is a strong, and unambiguous, correlation between the level of spending and investment in R&D with levels of innovation and productivity in an economy. This is particularly so in the developed world where input and labour costs are generally higher, necessitating new approaches to doing business.

Technology and innovation advancements can break down geographic barriers that have previously prevented WA manufacturers from accessing international markets and supply chains due to our relatively small population base and geographical isolation.

However, Western Australian manufacturers spent just \$348 million on R&D activity in 2011-12, equating to 2.9 per cent of the industry's output in that year. This compares to the national benchmark of \$4.5 billion in R&D activity, or 4.3 per cent of national industry output. The relatively lower levels

of R&D in the state reflect the industry structure: predominately small businesses that typically have a limited ability to divert capital away from operational activity to raise internal capital for R&D.

There is scope to lift R&D spending to ensure that the sector can be competitive in the international market. However, solutions must be driven by industry and meet the needs of industry, rather than be driven by government. While innovation can deliver substantial benefits, it is also an inherently risky activity and, often, the benefits are not limited to the business that has taken the risk to carry out the research. This means that R&D occurs at a lower level than would be optimal for the economy as a whole and government incentives to encourage additional business investment in R&D can often be justified.

Research appears to demonstrate that the most effective way to encourage industry-led innovation is through the tax system. The return on investment generated by tax credits, which place the onus on industry to develop solutions, is much higher than the return generated by grants, the conditions of which are dictated by government. This was reinforced by the Commission of Audit Report, which recommended that the Commonwealth Government's approach to innovation be rooted firmly in an economy-wide, industry-driven approach as opposed to the ad-hoc, grant-based approach that has characterised past government industry policy.

According to the annual report of AusIndustry, the R&D Tax Incentive in Australia has a striking multiplier effect of 11 to one, with \$16.8 billion worth of research, development and commercialisation supported through just \$1.4 billion worth of foregone tax revenue on the part of the Federal Government.

In light of this, and perhaps extraneous to the Committee's Inquiry, the Commonwealth Government should review existing funding directed towards programs to encourage innovation and reprioritise away from direct support towards tax incentives that deliver the greatest return on investment. Other developed nations, such as Canada and the UK, provide more generous tax offsets for R&D activity, with some items of expenditure granted a 150 per cent or more offset on expenditure.

Rapid industry changes driven through innovation and technological advancement lead to increased demand for new skill requirements. As WA manufacturing moves to producing more innovative products and processes, the key focus for this industry needs to be on ensuring that it is equipped to up-skill, re-skill and attract the new skills required to remain competitive.

At a high level, the skills required within manufacturing are likely to shift more towards the ability to operate complex and technical machinery and equipment. However, there will still be some requirement for simple skills. Manufacturing relies heavily on apprenticeships and traineeships to provide the skilled workforce required in the industry. Simplifying the training system will be an important strategy to encourage employers to continue to hire apprentices. The current national training system is a complex and often confusing system to navigate for both apprentices/trainees and employers.

It is also important that training is relevant to future industry needs. Industry must work more closely with training and education providers to ensure training is tailored to their needs. This can be achieved through collaboration in course design, engagement with industry-relevant representatives who understand the complexities of training packages and outcome requirements; and the greater use of specialised practitioners in course delivery and evaluation.

Since the 2008-09 Global Financial Crises, offers for commercial financing from banks and other financial institutions in WA have contracted due to risk-aversion. This has led to an environment where it has been difficult for manufacturing businesses to raise the funds they need to grow and invest. However, this does not necessitate direct government intervention to address the issue.

There are challenges for financing in the manufacturing sector with many manufacturers small businesses, which generally have weak equity positions. This makes it difficult to achieve a sound debt-to-equity ratio without putting up some form of property assets as collateral. Manufacturing firms often have uncertain and lumpy cash flows, or cash flows based on contracts, which are awarded at a point of manufacture.

The State Government must play a key role in ensuring that regulation and approvals are streamlined for manufacturing businesses with less imposition on starting up, as well as expanding their operations. There is an array of complex and excessive state and local regulatory policies which can lead to unnecessarily high compliance costs, and onerous regulations and restrictions to business expansion. Reforms are needed to reduce cumbersome, duplicative, and ineffective regulations, and to ensure that new regulations are appropriately assessed. For businesses in the manufacturing sector, the main areas of regulation include occupational health and safety laws; disposal of waste products; protecting buffer zones; and local government regulations (which are inconsistent across local government areas).

Achieving reforms will require a more structured approach to the development, assessment and review of regulation. A key issue is that responsibility for regulatory reform has been spread across different agencies and other bodies, and so there has been limited accountability for reducing the regulatory burden. To address this, reform and gatekeeping matters in WA should be transferred to a single, sufficiently resourced, independent group such as the Economic Regulation Authority.

Relevant and beneficial reform of the industrial relations framework should also be considered by the Committee. For example, in terms of overall labour market efficiency, Australia has fallen from being ranked 19th in the world in 2006-07, to 56th in 2014-15. Australia's rating is held up by factors outside the industrial relations system, including the share of women in the workforce, reliance on professional management to make decisions and levels of human capital. This evidence suggests that the industrial relations system is what is holding the country's competitiveness back.

This strong decline in labour market competitiveness has correlated with the introduction of the *Fair Work Act 2009* (Cth) (FW Act). The FW Act has provided unions with an increased role in the regulation of employment matters, resulting in an increase in the distance between businesses and their workforce. Most importantly, there is now less flexibility in Australia's labour market, reflected in our competitiveness in flexibility of wage determination slipping from 85th in 2006-07 to 132nd in 2014-15.

Reduced flexibility and labour market competitiveness ultimately restricts the ability for business to be innovative. It also discourages international and domestic businesses from investing in Australia, as other countries are seen as a more attractive option. It is therefore vital that Australia's workplace relations regulations be made more flexible and simpler, in order to foster an innovative business environment.

Mining and Energy

Innovation in the State's mining and energy sector is, simply, driven by the need to respond to intense international competition. Western Australia's mining and energy sector is mature, operates in a high cost environment, and is subject to volatile commodity prices. In Western Australia, innovation is being driven by: commercial imperatives to improve operational efficiency and reduce costs; stringent safety standards; the need to exploit new reserves from technically difficult locations; and the availability of new technologies with applications in the mining and energy sector.

Applied research in the mining and energy sector presents opportunities to increase the development of WA's resources and to export services and technology to the rest of the world.

The significant investment in WA's iron ore and LNG production capacity presents significant ongoing engineering challenges for resources companies requiring innovative solutions to maximise operational efficiency and to reduce costs. As a result, a number of collaborative research centres have been established in Perth in the past decade by universities, government and major resources companies. Three examples are here provided.

First, the Australian Resources Research Centre, a collaboration with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), University of Western Australia (UWA) and Curtin University, was established to create a petroleum and minerals centre of expertise for the Southeast Asian region and the centre has over 70 industry clients.

Secondly, Chevron's Perth Global Technology Centre established in 2007 and Woodside's Innovation and Technology Hub established in 2015 are research and development centres tasked with developing technology solutions for the petroleum sector in collaboration with Western Australian universities.

Finally, the Western Australian Energy Research Alliance, a collaboration between the CSIRO, UWA, Curtin University, Shell, Chevron and Woodside is conducting research in the areas of gas technologies, geosciences and subsurface technologies, facilities and innovative technologies.

Applied research in the mining and energy sector presents opportunities in Western Australia for the export of innovative products. For example, Inflatable Packers International, a Western Australian based engineering firm has researched and developed innovative inflatable packers used in well construction in the oil and gas sector. Inflatable Packers International now exports its products from its Osborne Park factory for use in a variety of applications in North America, Latin America and Europe.

Due to its capital intensiveness the mining and energy sector is dominated by a small number of large multinational firms with sophisticated financing and commercial imperatives to invest in research and development of new technologies and processes.

Collaboration between resources companies on research and other activities has been shown to deliver significant cost savings internationally. This is particularly important for the diffusion of new technology to smaller companies.

Although competition law rightly prohibits companies from engaging in collusion to fix prices and output, collaboration between companies can be procompetitive where it increases the supply of a good or service or the efficiency with which a good or service is supplied.

While there have been some encouraging developments in recent years as evidenced by the collaborative research efforts noted above, the level of collaboration in Australia is significantly less than in other countries and Australia may benefit from similar types of resources sector collaboration as has existed in countries such as the United Kingdom and Canada over a long period.

In the UK, the Government chairs PILOT (formerly the Oil and Gas Industry Taskforce), a forum of industry stakeholders tasked with advancing initiatives directed at reducing cost, eliminating barriers and maximising the effectiveness of resources in the oil and gas industry. PILOT established the Industry Technology Facilitator to foster innovation and facilitate the development and implementation of new technologies.

In Canada, various industry associations encourage significant collaboration between operators in areas of technology development (oil sands), environmental performance, sharing best practices and infrastructure sharing. Members of Canada's Oil Sands Innovation Alliance (COSIA) have shared 777 distinct technologies and innovations that cost over \$950 million to develop.

Outside the Box 1: Germany's *Mittelstand*: International Lessons for Innovation within WA's Economy

It is no exaggeration to describe the Small-to-Medium-Enterprise (SME) section of the German economy known as the *Mittelstand* as one of the miracle stories of the post-Bretton Woods global economic order. Often referred to as the “backbone” of the German economy, the *Mittelstand* can be partially credited with the German Republic's successful, and comparatively unscathed, emergence from the 2008-09 Global Financial Crisis.

Mittelstand companies fall between micro-enterprises, that constitute approximately 83 per cent of German businesses) and the much larger corporations which constitute closer to 0.5 per cent. Typically, these enterprises comprise between 10 to 250 employees and boast annual turnovers between approximately €2 million to €50 million (or approximately A\$3 million to A\$80 million).

While these SMEs are active in various sections of the economy, they can often be characterized by:

1. Incredibly focused areas of specialization;
2. High proportions of investment in R&D;
3. Associations with research centres;
4. Commercial relationships with larger industry;
5. Responsible financial management; and
6. A sense of social and community obligation.

For the purposes of the Committee's present Inquiry, CCI believes that close attention should be accorded to the role of *Mittelstand* companies in Germany's manufacturing and industrial sectors. These sectors often produce specialized equipment or chemical compounds, as well as German international trade.

Significantly, and with regard to the Committee's interest in manufacturing, it is notable that Germany has managed not only to retain an impressive manufacturing base, but has also, at times, managed to increase manufacturing exports to markets with much cheaper labour costs (notable, of course, China). In the German situation, *Mittelstand* companies comprise approximately one quarter of all manufacturing businesses and, at 42 per cent, employ close to half of the entire national manufacturing workforce. In addition, these SMEs provide approximately 35 per cent of value adding for the industry. To put this into context, it has been estimated that manufacturing accounts for approximately one fifth (€581.3 billion, or A\$861.4 billion) of German GDP (presently estimated at €2,611.3 billion (or A\$3,867.9 billion)).

In part, it is the very narrow areas of specialization of *Mittelstand* companies that provides a comparative advantage. Further, these companies generally aim to maintain their competitive edge through comparatively high proportional levels of investment in R&D. In this respect, connections with local research institutions are obviously important. However, another apparently crucial factor in *Mittelstand* success is the role of the *Fraunhofer-Gesellschaft* (or Fraunhofer Society: FS). FS is an independent non-government organization that provides applied research to SMEs that would not otherwise be able to afford it. FS helps these German SMEs upgrade products and processes. It can do so, in part, because of its scale. A multi-billion dollar enterprise, FS operates more than 60 research centres with more than 250 areas of commercial focus.

While a similar scale of endeavour may be impractical to implement within a Western Australian context, the role of FS as a bridge and facilitator between cutting-edge university research and industry-specific applied improvements is worth the Committee’s serious consideration.

Of course, the *Mittelstand*’s unique success has led to many attempts at replication. However, there are manifold features of Western Australia’s economic profile that suggest that greater efforts in understanding, and learning from, this aspect of the German economy should be strongly, and systematically, encouraged. Two notable similarities are Western Australian prominent industrial activities, and the importance of international trade to Gross State Product (GSP). Analysts have noted that, when compared to the German system, there is a “missing middle” within the Australian business profile. This is indicated by the approximate figures provided below.

Business size	Germany	Western Australia
Micro	83.0%	96.7%
Medium	16.5%	3.1%
Large	0.5%	0.2%

In the Western Australian context, the large discrepancy between micro and medium enterprises is significant for the fact that micro-size enterprises are normatively non-employing, with the majority of jobs in the SME sector coming from within the “medium” subcategory. The rate of manufacturing employment provided by the *Mittelstand* has been noted above. However, these companies also account for approximately 83 per cent of German apprenticeships and, being located in regional towns, help diversify the distribution of workforce education.

With regard to the role played by *Mittelstand* companies in generating export value, it is significant that while large resource companies comprise such a small fraction of the total quantum of exporting businesses, they understandably generate almost half of national export value. In contrast, it has been estimated that while Australian SMEs comprise approximately 86 per cent of total exporters, they generate only 5 per cent of export value. What is notable, however, is that it appears that medium sized enterprises account for around half of national exporters but, strikingly, 80 per cent of export value. In this context, it should be born in mind that exports currently account for 61.6 per cent of GSP. As such, the value-adding potential of the growth of such an enterprise profile within the Western Australian is another aspect that CCI considers that the Committee should seriously consider.

Finally, of course, it is often the financial capacity to perform innovation, and then commercialize on those innovations that can act as the biggest barrier to success. In this context, it is notable that in Australia there is, generally, a disjointed and often confusing variety of funding sources available for businesses. Strikingly, there seems to be little in the way of direct, and proportionate, assistance from the Commonwealth Government. Instead, the primary funding available to WA businesses in this space would appear to be through the WA Department of Commerce’s Innovation Vouchers Program. As the Committee is no doubt aware, this program awards up to \$20,000 to eligible SMEs to overcome some of the barriers to commercialization.

By way of comparison, Germany’s Federal Ministry for Economic Affairs and Energy operates the Central Innovation Programme to promote market-driven, technology-based R&D within German SMEs. This programme offers funding of up to €2 million of grant funding for a wider variety of R&D projects than the WA program.

Outside the Box 2: Intellectual property and patents

In discussing the commercialisation of innovation, it would of course be remiss to neglect consideration of the role of Australian intellectual property (IP) law. The most fundamental elements of this country's IP laws are, naturally, the granting of patents, trademarks and copyrights on IP. The Commonwealth Government maintains a register of IP held by Australian firms or businesses operating in Australia, through IP Australia.

Businesses that create new IP are required to apply for protection through IP Australia (protection is not automatically granted). Businesses pay a nominal fee for IP Australia to assess an application, and determine whether protection can be granted. In the meantime, businesses can apply for temporary protection through pending patents.

There are two types of patent applications available in Australia; standard and innovation patents. For the innovation patent to be granted it must involve an 'innovative step' and can only be granted if it complies with the relevant requirements of the *Patents Act 1990* (Cth). An innovation patent is only granted for eight years, while a standard patent is granted for up to 20 years.

On average, Australian resident applications for Australian patents only make up 10 per cent of total applications. Notably, Australian residents file roughly three times more patents overseas than they file in Australia.

In 2014, Western Australia filed 202 patent applications, the fourth highest number of applications in the country. In 2013, patents relating to construction associated with mining or drilling were the most filed patents in Western Australia. In 2014 the most filed patent application transitioned to applications relating to human necessities, and performing operations and transporting, in line with the most filed patents for the rest of Australia.

While an adequate level of patent creation is difficult to define, IP Australia reports that the number of patent applications made in Australia fell 13 per cent in 2014. Although according to IP Australia this may have been due to an increase in the threshold for consideration of an inventive patent which took effect in 2014. There was also a sharp increase and record number of patent applications in 2013, made in order to be considered before the consideration threshold increase.

One promising policy idea that is yet to be explored fully in the Australian context is the "Patent Box". This has been utilised extensively in Europe. The policy sees governments forgo some tax revenue on the profits earned on patented intellectual property if companies agree to commercialise a particular product or service in their country. The United Kingdom was the first country to introduce the regime, and it is now in operation across Europe and China.

While there are concerns that this practice may lead to profit shifting activities, it highlights that international capital is mobile and that countries that offer favourable tax regimes are able to attract and retain business. It also represents an effective way to encourage small businesses to embark on more innovative activity through the tax system.

The Commonwealth Government's 2015 Review of Australia's Research Infrastructure is considering the introduction of a patent box in Australia. The findings of this review should be considered in the context of providing greater incentives for businesses of all sizes to embark on innovative activity.

Other Significant Issue: Venture Capital

The ability for start-up and small business to access long-term debt options, at a reasonable interest rate, and access to equity is limiting the growth of the sector. One way to address this issue is through venture capital (VC).

VC is an equity investment with the provision of a long-term investment, rather than a short-term investment for trading or operational capital. VC investments generally occur early in a business' life-cycle, typically in the early expansion stage. As a result, risks associated with an investment are often unsecured and uneasily quantifiable.

In 2013-14, VC funds grew by \$516 million in Australia, with some \$2.2 billion VC funds under management. VC grew considerably in 2013-14 and Australia's largest ever VC deal was recorded, valued at \$266 million. Growth has been a result of corporate and foreign VC activity. In addition, a number of new VC early stage technology focused funds have emerged.

Changes to the Significant Investor Visa (SIV) program could see an additional \$500 million flow into Australia's VC industry. Migrants qualifying for the SIV are required to invest \$5 million into complying investments, with restrictions placed on direct property investment. Changes will see a mandated allocation of at least \$500,000 per investor into registered VC or growth private equity funds.

Changes could impact on migrants seeking a safer class of investments. However, changes will spread the risk portfolio of investors and improve start-ups and small business' ability to access equity investments.

Compared to Australia's international counterparts, Australia's spend on R&D from 2000 to 2010 has been of a greater share of GDP. Australia's share was 7.2 per cent, while the United Kingdom's share was 1.5 per cent, Canada's was 1.6 per cent, and the United States was 2.1 per cent. However, the extent to which VC is supporting R&D expenditure in Australia is significantly lower than our counterparts. For example, VC fundraising as a percentage of GDP in Australia was just 0.01 per cent, while in the United Kingdom it was 0.05 per cent, in Canada it was 0.06 per cent and 0.17 per cent in the United States.

While things have improved, and are set to further improve in Australia, the ability of start-ups and small business to access equity investment is seen as an important factor constraining the growth and development of high technology firms. The growth of VC is needed to support the development of new and existing high technology businesses in Australia.