

Australia 2030 Prosperity through INNOVATION Report on the Analysis of Stakeholder Consultations

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Preface

This Report would not have been possible without the time and commitment of several hundred people to participate in Consultation forums and interviews across the country. Their exceptional generosity is greatly appreciated. I look forward to the opportunity of follow-up conversations after Innovation and Science Australia's *Australia 2030: Prosperity through Innovation* and this consultation report are released.

Those who participated in interviews and were invited to participate in the Consultation forums are listed in the attachments to this Report.

The Report also draws on the outcome of an *Expert Opinion Survey* conducted following the consultations. I greatly appreciate the time taken by the 361 people who took the time to complete the survey instrument.

I would also like to thank the many Regional Development Australia Committees that provided venues to enable the consultations to take place.

It was a great pleasure to work with staff from the Office of Innovation and Science Australia in providing advice and material for the forums and being in attendance. Particular thanks to Todd Mansell, Mark Looney and Debbie Willimott in this regard.

I must extend particular appreciation to Todd Williams, an associate of Howard Partners, who undertook the task of inviting to the consultation forums, registering their attendance, and facilitating the discussion at the Forum events.

I would also like to thank my colleagues on the project – Mark Matthews (SDG-Economics- UK) and Don Scott Kemmis (Howard Partners) and Paul Simmonds and Patries Boekholt (Technopolis Group, UK) for their work on the project.

The Report reflects the views and opinions of people consulted and interviewed. However, any interpretation of those views is entirely the responsibility of Howard Partners.

John H Howard

Overview of Findings

This is a Report of the Consultations Program undertaken by Howard Partners to assist Innovation and Science Australia develop the *Australia 2030: Prosperity through Innovation* Strategic Plan. These findings along with the information provided in the 130 submissions received from the public consultation process have informed the development of the 2030 Strategic Plan. A list of those submission that can be made publicly available are at Appendix 1.

The Consultation Program sought to obtain the opinions of businesses, research and teaching organisations, government agencies and intermediaries about the current position, opportunities, and directions for Australia's Innovation Strategy. These meetings provided very valuable insights and context about what is currently being achieved, the constraints (and brakes), and actions and priorities to enhance innovation system performance over the short, medium, and longer-term horizons.

Appendix 2 lists the 176 innovation leaders who participated in direct interviews and group meetings. A further 233 people participated in Consultation Forums in all State/Territory capital cities and in Ballarat, Bendigo, Bunbury, Cairns, Geelong, Gold Coast, Launceston, Newcastle and Wollongong. We were absolutely delighted at the level of interest and participation.

Overall, our discussions generated a wide range of insights and opinions to assist the Board in the formulation of strategic priorities and action plans. We were also made aware of innovation strategies and accomplishments in business, universities, research organisations, NGOs, and government that often go unrecognised.

Our findings are grouped into several categories:

- Key messages, covering: Building and sustaining connections and connectedness across the Australian and global innovation systems, and particularly between the university/research, industry, and sectors and within sectors; establishing a broader understanding of the scope and context for innovation, particularly in the services sector and in the social and environment domains; commitment to stability and continuity in policy and program initiatives.
- Approaches to achieving innovation outcomes, including seeing innovation as an *'investment* in the future' setting stretch targets, addressing the emerging role of universities in driving industry and regional development, and factors relating to demographic change, diversity, and social inclusion.
- Considerations relating to the Strategic Challenges identified by the ISA as potential 'high impact large scale initiatives' to stimulate innovation' identified during the Consultations and Interviews.
- Laying the foundations for transitioning to Australia's innovation future, including reinforcing an entrepreneurial mind-set, leadership capacity and capability, access to capital, commercialisation capability, developing skills and talent for innovation, strengthening capacity for collaboration, and leveraging capabilities across policies, programs, and State/Territory Governments.

• Conclusions concerning addressing innovation outcomes, innovation system governance, levels of investment in science, research and innovation, developing a long-term Innovation System Budget and Plan, capturing the benefits of prior investments, and innovation system research

Many of these findings are not new and unsurprising. But they serve to reinforce the interests and concerns of key players in the innovation system. The Consultations were, however, able to build a depth of understanding of these areas of interest.

Overall, the Consultations program can be regarded as successful in terms of engaging with Innovation Leaders in an environment where people feel 'over consulted' – particularly in relation to government initiatives relating to policy development in science, research, education, and training. There is a high level of awareness of the intensity of innovation policy development regarding innovation over the last 25 years, reflected in numerous policy statements, initiatives, inquiries, reviews and evaluations.

The Consultations also drew attention to the following:

- All regions and cities are different: innovation ecosystems are at different stages of development and have different enablers from which to work from.
- Connectivity, particularly national digital connectivity, was an overarching theme in all consultations
- A perceived absence of long term policies to assist in developing innovation.
- The concept of innovation itself, where people particularly in the creative fields, are actually 'being innovative' but not seeing it that way. Innovation *is* the business.
- The importance of international knowledge sharing and mobility of talent.
- The role of regional innovation systems and the contribution of universities to driving economic development and renewal in depressed regions.

Howard Partners extends sincere thanks to the people and organisations who made the time to participate in the Consultations, which generally covered two hours, and be available for Interviews, which were conducted over one hour.

1 Approach to the Project

This Consultations Report, prepared by Howard Partners, provides findings and insights from an extensive Consultations Program conducted across Australia over the period March-June 2017. The Consultations Program involved conducting Innovation and Science Australia (ISA) sponsored interviews with innovation leaders. It was followed up with an Expert Opinion Survey, at Appendix 5, to calibrate the direction and strength of views articulated in the consultations program.

This Report presents material that is sourced only from the consultations. It does not provide insights from our broader understanding of the Australian, international, and global innovation systems.

1.1 Background: Twenty-Five Years of Innovation Policy Development and Review

The development of the 2030 Strategic Plan was also informed by the considerable number of reports and reviews undertaken by, or commissioned for, the Commonwealth Government over the 25-year period on the innovation system. This included reviews and reports– in the broad field of innovation, science, research, technology, and tertiary education and which are on the public record.

The portfolio, which totals over 150 documents, is divided into five main categories:

- 1. Government policy statements, strategies and plans (44).
- 2. Public inquiries, investigations and evaluations (71).
- 3. Productivity Commission inquiries and reports (6).
- 4. Reports from the Commonwealth Science Council (and predecessors) and Chief Scientist (20)
- 5. Parliamentary Inquiries and Reports (2).

There have been, in addition, a range of policy documents from other sources:

- 1. Insights from the Learned Academies, including the 13 Reports from the Securing Australia's Future (SAF) initiative.
- 2. The work of Commonwealth Government supported policy research agencies, including the Office of the Chief Economist.
- 3. Uncommissioned and unsolicited policy reviews and research presented by university and independent research institutes, industry and professional associations, professional services firms, including management consultants, and policy advocacy (lobby) organisations.

The knowledgebase created from this work is massive and provides a comprehensive perspective on Australia's innovation system. There are several common and continuing themes addressed in this material:

- Microeconomic reform, from 1991.
- End of the mining boom, and the need to find new sources of growth and wealth creation.

- A focus on manufacturing, manufacturing employment, and the need to preserve a manufacturing sector.
- Changing structure of industry, and the move away from large domestically based mass production organisations to smaller, more specialised interrelated firms in global value chains.
- The progressive movement to a services oriented economy, and requirement for knowledge based professional and technical skills.
- Growing attention to industry-research collaboration but a continual statement of the problem, perhaps reflecting a poor understanding of the fundamental difference in missions between business and university organisations.
- Commercialisation of publicly funded research and a greater role for universities in driving industrial innovation.

1.2 The Consultations Program

This Consultations Report is structured around an approach to strategic planning that reflects the following elements:

- Where are we now?
- Where do we want to be in terms of a vision?
- What are the key actions that will be required to achieve the vision?
- How are we going to get there?

An abridged strategic planning analytical framework, developed and applied in most of our previous strategy assignments is represented below.



This framework underpinned the approach to the Consultations Program. Figure 1 provides a summary of the stakeholder engagement undertaken in the development of the 2030 Plan which covered:

• Eighteen ISA badged Forums in all State/Territory capital cities and in Ballarat, Bendigo, Bunbury, Cairns, Geelong, Gold Coast, Launceston, Newcastle and Wollongong over the period 20 March to 18 May 2017. Over 230 people participated in these events: 34 per cent were from business; 22 percent from Government; 22 percent were intermediaries; 20.0 per cent were from research and teaching organisations, and 2 % were from other categories (NGOs and unclassified).

- Interviews with 176 innovation leaders from across Business, Research and Teaching Institutions, Intermediary organisations, and in Government.
- Meetings with State and Territory Government officers arranged by the Office of Innovation Science Australia
- An Expert opinion survey that calibrates insights and opinions of 361 participants

Figure 1: Summary of the Stakeholder Engagement for the 2030 Strategic Plan



The taskforce in the Office of Innovation and Science Australia engaged directly with the Commonwealth Departments throughout the development of the 2030 Plan.

A list of the organisations or individuals that submitted public submissions are at Appendix 1. A number of respondents lodged confidential submissions; the details of these submission are therefore not included in this list. The Innovation leaders engaged in the consultation interviews are listed in Appendix 2. A list of organisations invited to participate in forums in the development of the 2030 Plan are at Appendix 3.

1.3 Consultations objective

The Program had a particular focus on the ISA Board's thinking about the Strategy developed up to February 2017, which was reflected in a one page *Overview Paper* distributed prior to meetings, at Appendix 4. A longer <u>Issues Paper</u> was released publicly on 24 March 2017.

At a meeting in December 2016 the ISA Board adopted a draft vision for Australia's national Innovation, Science and Research System which was used during the consultation process:

We want an Australia counted within the top tier of innovation nations, known and respected for its excellence in science research and commercialisation.

Innovation, which can underpin a diversity of internationally competitive industries, will enable today's and future generations to have meaningful work, a great quality of life in a fair and inclusive society.

At that time, the Board had identified six *Strategic Challenges* to achieve the Plan's vision:

- Moving more firms, in more sectors, closer to the innovation frontier.
- Moving and keeping Government closer to the innovative frontier.
- Delivering high-quality and relevant education and skills development for Australians throughout their lives.
- Maximising the engagement of our world class research system with end users.
- Maximising advantage from international knowledge, talent and capital.
- High impact, large scale initiatives to stimulate system innovation.

The vision and the above challenges formed the basis of discussion at the ISA Forums and interviews.

1.4 Case studies and entrepreneurial firm profiles

During the Consultations, Howard Partners had the opportunity to make site visits and record interviews with 20 innovative companies and co-working spaces. Those covered are:

- 1. Academy for Interactive Entertainment <u>http://www.aie.edu.au/</u>
- 2. AC Solar Warehouse http://www.acsolarwarehouse.com/
- 3. Bluezone http://www.bluezonegroup.com.au/bluezone-home
- 4. Darwin Innovation Hub http://darwininnovationhub.org/
- 5. Evolve <u>http://www.evolvegrp.com/about-us</u>
- 6. EM Solutions http://www.emsolutions.com.au/
- 7. Fishburners <u>http://fishburners.org/</u>
- 8. Hello Claims https://www.helloclaims.com.au/
- 9. Imagine intelligent materials http://imgne.com/

- 10. Intellidox http://intelledox.com/
- 11. Lang O'Rourke <u>http://www.laingorourke.com/</u>
- 12. Maker+Co http://www.weliketomaker.com/
- 13. Mineral Carbonation International http://mineralcarbonation.com/
- 14. Pixelated induction https://www.pixelatedinduction.com/
- 15. Reposit https://www.repositpower.com/
- 16. Sustainable Materials Research & Technology (SMART) <u>http://smart.unsw.edu.au/</u>
- 17. Spinify https://spinify.com/about-us/
- 18. Spee3d https://www.spee3d.com/
- 19. Think Place http://www.thinkplace.com.au/
- 20. Thomas Global http://www.thomas-global.com/

The visits provided an opportunity to discuss and obtain insights into the entrepreneurial opportunity, the development of that opportunity, relationship with a university/research organisation, critical success factors, and impact. This these case studies will be written up over coming months.

2 Some Key Messages from the Consultations

In undertaking the consultations, and writing this Report, we wanted to anticipate the question 'what are the most important messages that you have picked up in the consultations?' Nine key message areas have been identified, which are canvased below.

2.1 Build and sustain connections and connectedness

Building better connections and connectivity between business, research organisations and government emerged as an underlying message in all consultations. The consultations indicated a strong interest in the 'Triple Helix' framework as a way of representing and comprehending interactions and connections between the three principal 'institutional pillars' in the innovation, science and research (ISR) system - Industry/Business, Research and Learning, and Government (Figure 2).

The consultations supported a view that dynamic interactions and connections between business, universities and research organisations and government is a critical aspect of the ISR system's performance – locally, regionally, nationally and globally – and is an area where the system's performance must be improved.



Figure 2: A 'Triple Helix' view of relations between research, industry, and government

Connections generally occur through:

- Networks community of interest, sharing, personal contacts, conferences/events.
- Transactions licensing and transfer of IP, research contracts, consultancy.
- Formalized relationships collaborations, partnerships, joint ventures.

Connectedness is an important extension of 'collaboration', and connecting universities, industry and government is a major imperative – and a challenge. National and global digital connectivity also emerged as a key issue.

It was apparent from the consultations that the three sectors want to improve collaboration performance, but they are often unclear about how this should be done. Nonetheless, there has been major progress made over the last five years.

The Consultations indicated that connectivity will be a fundamental requirement for achieving strategic outcomes in the realisation of ISA's vision and objectives in the ISR System Strategic Plan. Connections require nurturing, experimentation, and investment. This will involve –

- Development of capability for effective networking hubs, innovation districts, precincts, and 'virtual' associations.
- Transfer and translational capacity involving Technology Transfer Offices (TTOs), Deputy Vice Chancellors (DVCs) Research/Innovation/Engagement, independent innovation intermediaries.
- Building partnerships and relationships formally established and with research centres, institutes, partnerships and joint venture agreements.

Matters to address in improving connectivity are canvassed below.

2.1.1 Connections between business and universities/research organisations.

There was widespread discussion in the Consultations Program about the level of engagement between business and universities. There was also concern about the reported low levels of interaction between the sectors as indicated by various official measures.

Visits to universities, discussions with DVCs Research and Innovation, and industry leaders suggested that engagement had improved over the last 10 years, but there is still more to be done. In particular, there is a view that business-university relationships must move from a 'transactional' basis to a longer-term partnership basis. There is a particular challenge for SMEs in engaging on a long-term basis.

There was a view that over the last several years businesses have been seeking to be more actively engaged with universities. However, from the *Expert Opinion Survey*, Figure 21 (Appendix 5), only 92 of 293 respondents to the question (31 per cent), agreed or strongly agreed with the proposition that "businesses are actively seeking to engage more effectively with universities over innovation"

A relatively small number of respondents (97 or 34 per cent) agreed or strongly agreed with the proposition that "there have been major improvements over the last ten years in how effectively businesses engage with universities over innovation" (Figure 22 in Appendix 5).

Responses to the proposition that "there are now mature collaborative relationships between business and university leaders" (Appendix 5, Figure 64) indicated that 91 agreed or strongly agreed (32.6 per cent of responses), whist a similar number (88) disagreed or strongly disagreed. One hundred responses were ambivalent. But *within* the responses, 47.4 per cent of respondents from universities/research organisations agreed or strongly agreed with the proposition, but only 27.5 per cent from business/industry respondents, and 19.1 per cent from government respondents had this opinion (Figure 3).

In many ways, this reflects an older stereotypical view apparent from consultations with sections of the business community, and a lack of awareness of some fundamental changes in approach by universities towards industry engagement over the last several years.

Thus, while progress is being made in improving connections between business and universities/research organisations, there would appear to be a little bit further to go, particularly around a new narrative that creates awareness of results, impact, and potential. The consultations identified many initiatives where universities/research organisations and intermediaries are seeking to further lift the level of engagement.



Figure 3: Business engagement with universities

2.1.2 Connections between universities and government

The consultations indicated that relationships between universities and the Commonwealth Government are at a low ebb. Currently it is predominantly a transactional approach built around funding programs rather than relationships built around partnerships and a recognition that universities are key players in Australia's innovation future.

Universities generally recognise that some of the drivers that the Commonwealth has recently put into the system are positive in terms of driving a stronger innovation agenda. The new

research block grant funding arrangements have de-emphasised the contribution of outputs like publications and given a priority to impact. Having impact as a measure through the ARC is also seen as a positive.

Universities commented that prior to those and a few other changes, the focus was 'pretty much on research excellence rather than on what to do with the excellent research'.

Universities also point out that what is frequently missed in conversations, is that the primary business of the majority of the universities in Australia, is teaching and learning, not research. University leaders commented that the teaching and learning is actually the profitable side of the business. But the profit is required to cross subsidise other parts of the business. How the surplus is allocated is a strategic resource allocation decision for University Councils and reflected in Strategic Plans and Budgets.

Governments would appear to have a 'grants' rather than an 'investment' mind-set for universities. There is, however, an emerging pattern of co-investment between universities and governments, particularly state governments, around a 'partnerships in development' type of strategy. This is in evidence, for example, in the optical electronics initiative between South Australian universities and the State Government.

It was suggested during consultations that universities should develop a strong narrative about working in partnership with Government in achieving economic, industry and social development outcomes. As an industry sector in its own right, universities have a major role to play in this direction. State governments have worked out the key strategic role of universities and are looking for longer-term relationships though their Innovation/Productivity Councils.

2.1.3 Connections between business and government

There is scope for improvement in the connections between business and government. The relationship has developed around a 'purchaser-provider' arrangement and the emergence of a strong and vocal lobbying sector in Canberra.

Procurement and probity requirements have created a wall between Government and Business that are essentially transactional and often short term in nature. Government finds it difficult to tap into the collective knowledge base of business and industry, preferring formal and open transactional approaches. In the AIIA consultation forum in Canberra, a participant observed:

I'm baffled that the millions of dollars of ICT services that many of us around the table, who represent companies that offer to the federal government, have not been invited in, to have a session, that talks about your experience with the government sector, the private sector's perspective, individually. I'm not talking about collectives and ticking boxes as if we've done it. I'm talking about in depth analysis of the *experience of engaging with the government and providing ICT services.*

Unfortunately, there is a perception that Government seems to think it knows better about how to address the innovation challenge. In the ICT sector, there is a view that:

For some time, we have a government that wants to keep doing things itself ... Government needs to set the framework. It has some things it needs to do, particularly where it's inappropriate or where there's market failure, but it doesn't need to be building a lot of the solutions it does, because the businesses, that are actually driving the competitive forces in our economy, can actually do it.

This approach works against the ideals of 'open innovation'.

The Consultations that have formed part of the preparation of the Strategic Plan should be seen as a first step in an ongoing, direct, dialogue between Government and industry.

2.1.4 Connections between businesses

During consultations, there was a great deal of discussion about how businesses could connect and collaborate, whilst still maintaining their strategic (and statutory) responsibility to compete. Observations from the consultations include:

- Participation in informal business networks is considered vital for business success. Industry organisations and professional associations have an important role, as do community organisations and the *social capital* created in innovation hubs, districts and precincts.
- SMEs can have a key role in large corporate innovation sourcing strategies. However, large businesses often tend to adopt a predatory, rather than collaborative approach to SMEs.
- There has been a trend towards large businesses 'breaking up' and 'connecting' more informally to stimulate innovation, flexibility and agility. Based on the strategy developed by Richard Branson (Virgin), BlueScope is adopting this approach to strategy and is the basis of its success in USA.

Respondents were aware of the need to build networks of trusted advisers to enhance innovation performance. In response to a proposition in the *Expert Opinion Survey* that, *'Businesses have a sufficient understanding of the value of networks of trusted advisors to enhance innovation effectiveness'* only 59 of 279 respondents (21.1 per cent), agreed or strongly agreed. A total of 149 (53.4 per cent) disagreed or strongly disagreed (Figure 23 in Appendix 5).

Consultations indicated a need to build intermediary capability involving independent and objective trusted advisers and "value adding" mentors, who can build learning connections between businesses over the longer term. *The apparent absence of a strong independent intermediary capability is an important issue for innovation policy.*

2.1.5 Connections between universities

Universities are autonomous public organisations. They compete – for students, for research funds, for money. Several universities had a concern that grant 'funding' arrangements exacerbate this:

- Grant allocations are made from a pre-determined amount of money that identifies a purpose for the funding.
- Submissions are lodged in an endeavour to satisfy pre-defined eligibility criteria, including alignment with research priorities. These can be interpreted widely, and ingeniously by professional grant writers.
- Assessments are made on some sort of rating or scoring scale.
- Distribution of funds may be made with a mind for 'fairness' in distribution across States/Territories and institutions.

Unless specifically provided for in the funding criteria, there is little incentive for universities to connect and collaborate. This works against building scale and establishing areas of specialisation across the sector. However, scale is considered to be essential to assist in building depth in knowledge and capability in both research and research translation. Monash and Melbourne universities agreed in June 2016 to create a joint research translation enterprise to bring a much larger share of their biomedical and clinical research to market.

It was reported in Consultations that many universities have sought to, independently, establish capability in fields such advanced materials, including for example, graphene, cyber security, and high-tech manufacturing. The Industry Growth Centres are considered to have an important role facilitating linkages to this capability. The university groups have an important role in building scale and connections across universities in their network.

Connections can be improved where funding organisations adopt a *strategic approach* to investment in capability. This will require funding organisations to develop investment strategies and for universities to collaborate to *build a business case for an investable project*. This approach, successfully adopted in the Education Investment Fund initiative, also gives a focus on outcomes and results to be achieved. The Rural R&D Corporations largely operate on this principle.

2.1.6 Connections between and within governments

During the consultations, there was concern expressed about 'siloed' approaches to innovation within and between governments. There was also concern about the absence of an *Australia Inc.* approach to innovation. There was a particular concern about representation of individual State

Government interests at international events, delegations and trade shows which was seen as sending a mixed message about an 'Australian' approach.

States have competed vigorously for many years in relation to inwards investment attraction, principally about generation of employment. A range of concessions is offered, including budgetary assistance, payroll tax exemptions, and facilitation of change in land use regulations. Some States are involved in a 'zero sum' of attracting businesses from other States/Territories.

When the potential for achieving greater coordination through the COAG arrangements was raised in Consultation Forums, it was generally met with benign smiles. But whilst the federal structure of Australia is acknowledged, it is seen to be important that Australia projects a consistent and collaborative approach to innovation internationally.

2.1.7 Connections with international markets, talent and capital

Participants in Forums and interviews acknowledge the fundamental importance of deep knowledge and sustained presence in international markets and global value chains. It was generally acknowledged that the concept of 'complete product' merchandising is of decreasing relevance.

The importance of international connections comes out strongly in responses to the Expert Opinion Survey.

2.1.8 Digital connectedness

The large number of businesses that are not connected digitally – to the Internet, and each other – was raised as a serious matter of concern in consultations. Comments were associated with the poor quality of Australia's public broadband service, particularly in comparison with our global competitors.

2.2 Establish a broader understanding and context for innovation

In many Forums participants raised concerns that there is not a clear definition of innovation. This can be a little disturbing, as from a business and innovation policy perspective, innovation is, quite simply, the practice of new ideas being successfully applied¹. Success is generally

¹ This is a shorthand definition of the OECD 'Oslo Manual' definition: 'An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations'.

interpreted as 'adding value' – value to a business (shareholders, employees, and customers), an industry, government, and the broader natural and socio-cultural environment.

But innovation is also changing in the sense that it has moved from where we were ten years ago when the first iPhone was released, and the concept of an 'App' was very innovative. Apps are now mainstream and now tend to support underlying services that deliver value. But the value is not in the App: it is in the underlying service value and the App is a wrap up that sits on top of it.

There is also a view that innovation has become contestable and there are large segments of the community that do not have any ownership of the concept. As Stuart Cunningham remarked in an Interview:

It may be of comfort to those who have to deliver programs in this area to try and settle in on some very known elements - which really are around manufacturing, how to get manufacturing working more efficiency, with more competitiveness and to be a driver of productivity gains. These are the heartland issues as they have developed in this country.

This question of where the heartland focus for innovation is expressed through the national research priorities in the sense that advanced manufacturing, biotechnology, energy, the so-called MET sector, agriculture. These are the known quantities, or at least they're better known than anything else.

The contestability arises from the fact that these are very important but if they're expressed in the way that have been expressed recently with notions of IT, high-tech and the digital leading the way, a lot of people will feel that they don't have any ownership of it.

This became a critical problem for the current government when it was apparent that in the 2015 election, there was quite a discernible backlash against if you like, to put it 'charicaturely', the inner-city hipster model of innovation. So, there was an attempt briefly to say, 'Innovation is for all.' And then essentially it slipped off the radar.

It follows that if innovation is to be embraced more broadly, it can no longer just be an 'expert system' approach. It was also pointed out during consultations that that other countries and regions, particularly Europe, have more developed approaches to innovation and have embedded social innovation, creative innovation, and public sector innovation in their Innovation agendas.

2.3 Address the imbalance between research investment and industrial structure

There was a concern raised in consultations about the 'misalignment' between the shape of industry in Australia and the shape of the basic research carried out in universities and research institutes - in our institutions, and whether there had ever been any attempt to achieve a better alignment.

For example, it was observed that there is a very large amount invested in basic health and medical research, but without a pharmaceutical industry, there are limited opportunities for adoption and application in Australia. The following observation was made:

People complain about things being taken offshore for development, but if there is no pharmaceutical industry, that's almost an inevitable outcome of putting a lot of money into really high performing research institutes around the country in health and medical research and the amount of dollars that go in there, it's almost inevitable then that it will end up offshore because there's no industry to support it.

Many years of institutional development has led to that situation. The National Health and Medical Research Council was established in 1932, but the Australian Research Council is a much more recent creation. Even now, the NH&MRC allocates more funds to one industry sector than the ARC does for all industry sectors. Agriculture, forestry and fishing is largely supported through the Rural Research and Development Corporations.

However, others have observed that with the very large investment in health and biomedical research 'we are on the verge of the next CSL flowing from investments started at the turn of the century'.

The Prime Minister has argued that universities and research institutes need to be agile in responding to industry opportunities. But, it was argued in consultations, research institutes *are* agile in that they will always follow available dollars:

Why do we have more than 50 medical research institutes outside of universities? Because there's a lot of dollars there. They happen because of dollars. It's not being agile, you can't undo that kind of system quickly unless you very purposely and slowly move your dollars to whatever it would be, researching whatever area that would better align with industry.

The manufacturing industry generally doesn't put money into the university sector. Interestingly, agriculture does, through the RDCs and the levy system.

Academics here are no different to academics in other countries. They're probably very similar types of people, different cultures, but very similar types of people and you give them the right incentives and they'll follow those incentives. You have a country like Germany or wherever, where the right incentives may have been established for a long period of time, and therefore you have that long-term engagement.

Although construction is a major contributor to the economy, there is comparatively little investment in R&D relating to the built environment, building design and delivery, and workplace issues. There are, of course, a number of research centres in these areas, but they struggle to source funding.

It would appear from the consultations that business, research organisations, and government find it difficult to come together to create the long-term strategic partnerships that provide the basis for building research capability and collaboration. The CRC program stands out as one of the most successful platforms for buildings collaboration.

The CRC program has been important in building this long-term commitment and engagement with 217 successful CRC applications since 1991 amounting to \$4.26 billion. However, 23 per cent of the investment has been in agriculture, fisheries and forestry, 20 per cent in the environment, and 18 per cent in health, medical and biotech. Just over 14 per cent has been in manufacturing and materials, but approximately 3.5 per cent has been allocated to services generally, and less that two per cent of the investment has been allocated to construction and infrastructure².

It follows that with greater investment from business in collaborative research in areas such as construction and infrastructure and services, overall research investment could be more strategically aligned with Australia's industrial structure.

2.4 Address the future of work in a services innovation context

Discussion of developing STEM skills was raised in every Forum. There was a perception that we need more STEM skills to address the future, and it has very wide-spread support.

² Figures on services and construction and infrastructure determined by analysis by Howard Partners.

It was pointed out that the STEM agenda is largely directed towards the primary and secondary sectors of the economy, which is considered to be very important for productivity. However, the more productive Australia is in these sectors, the less people will be employed in Australia's high-wage economy. Manufacturing, agriculture and mining are continually declining contributors to Australia's employment future.

Consultations indicated that Australia has lagged behind other innovation nations in *services sector innovation* because it has not fully grasped the importance of design-based innovation and design thinking. An interviewee pointed to the data assembled by the Alpha Beta Consultancy Group which studied four million plus job advertisements on Seek and other major job seeker sites between 2012 and 2015, that indicated a 212 per cent increase in jobs demanding digital literacy, 168 per cent increase in jobs demanding critical thinking and a 120 per cent increase in jobs demanding creativity.

Digital literacy is not just about everyone knowing enough about coding to be digitally literate in that respect, although that is important. It's about where the jobs are going to be, are people who can integrate digital technology into the service sector as well as other service sector work of the future.

Typically, it was argued, in the standard model of innovation that these would be regarded as *soft skills* - particularly creativity and critical thinking. These skills are not 'soft' any longer, it is how people get work. They are actually skills that become the qualifications for a lot of work, particularly in the services sector.

In social media management for example, is was said that 'you don't have to be a coder to be brilliant at solving corporations' social media management issues'. Social media management is needed right across the economy. It is expected that there will be a demand for thousands of people with skills in this area.

There is also a growing interest in innovation around government service provision and funding social enterprises. For example, an interviewee observed:

Governments may decide to fund a potentially innovative company not because it's going to produce a \$10 billion company, but it's going to lower the cost of service provision for mental health by 10% - the savings to government on that are astronomical. And so, while you might then have a business that becomes a non-profit, for government, it's a simple transaction because the payoff is huge. So just changing how we look at it is also really important. I could go get funding for an app pretty easily tomorrow if I really wanted to. But I probably couldn't

get funding for a social venture. And yet the social venture would have much greater payoff in terms of public value.

The NDIS has been setting up an innovation hub around assisted technology. There may not be a big commercial payoff, but there is a huge potential to create public value. These initiatives also have the potential to enable people with disabilities to undertake meaningful work.

2.5 Focus on solving problems, big problems

The consultations indicated that a new way of 'doing innovation' is emerging and is being directed towards solving complex, or 'wicked' problems. Australia's future in industry, environment and society is seen to be about solving complex problems. Design thinking has emerged as an approach to addressing these complex issues.

There was a reported need for innovation to address issues that people really care about more broadly, such as the growing inequality agenda, the future of work agenda, and the whole environment agenda - particularly climate change. Addressing these areas will also require thinking about how trans-disciplinary knowledge inputs and cross sector approaches can be incentivized:

We know the value to the Australian economy of agriculture. We know to some extent, perhaps not as great an extent but we still have a pretty good understanding of the value to the Australian economy of tourism. But at a higher level what is the value of environment? That includes both.

Our thought leaders in agriculture are as concerned about the environment as tourism operators are. So, you've got to get above the special interests of particular sectors, such as in north and central Queensland. It's a particularly wicked problem. Everyone's got a stake in the environment, everyone. How can you get above the level of sectional interest and to that level where that's a real contribution to innovation?

We are not alone. The Great Barrier Reef is the largest reef system in the world. But every other reef system is facing similar issues of longterm degradation. Many of which aren't anywhere near hot spots of mining and agricultural sedimentation problems. Ours is particularly wicked because economic activity of one sort sits entirely adjacent to economic activity of another sort. They look like they're totally opposed but they both have a very strong stake in the environment. It's often said that our burning platform is the end of the mining boom and the loss of jobs and so on associated with that. But what we're alluding to, is that some of those burning platforms are in the environment or the social area. They're burning at a slower rate but they are just as burning.

It was suggested that the system does not reward or acknowledge people and organisations trying to do things that are 'big, really big'. It seems that the policy focus is on people wanting to do something that's agile. *Innovation is heavily focused on 'doing it agile'.* There are, however, many things that cannot be 'done agile'. It was observed that:

You can't build planes agile. You can't launch things into space agile. You can't do energy agile. You can't talk to your customers agile. But we can talk to our customers about doing 'big innovation'.

In this context, it was pointed out on many occasions that researchers work better with industry when there is a big problem to be solved. University faculties, research centres, and research organisations are not well set up to deal with transactional, short term and low small one-off consultancy type projects. *They are not generally set up to be 'agile'*.

2.6 Re-affirm the link between innovation and productivity

The link between innovation and productivity did not come through strongly in the Consultation Forums, but received more attention in the Interviews, where it was acknowledged that innovation in environmental and social domains is likely to be major contributor to productivity change. This includes:

- Building and construction BIM systems, virtual and augmented reality, automation, new materials, modular construction, green buildings, design of cities and urban renewal.
- Health services delivery digital connections, diagnostics, personalised medicine, workplace health and well-being.
- Education and training delivery, content, global providers.
- Law and public safety crime prevention, detection, enforcement, workplace/occupational safety.
- Social and community services communication, understanding of service need, monitoring and access.

These opportunities are in the services sector. As indicated elsewhere, they exhibit strong opportunities for application of design innovation and design thinking.

2.7 Address the geography of innovation

Discussion of the 'geography of innovation' was raised in most Forums, but particularly in regional locations.

Whilst it is acknowledged that innovation clusters and districts may thrive when there is a large R&D intensive corporation present, the Australian context makes this challenging given the relative small number of R&D intensive corporations. Most of Australia's publicly listed corporations are in the property development or financial sectors.

The consultations and interviews pointed to the way in which property developers, universities, and State and Local Governments are working together to extend campuses, partly in response to the boom in student numbers, but also in response to the opportunity to build innovation centres and hubs that draw on university generated knowledge and the potential for transfer and translation.

These approaches have been quite strategic (as distinct from opportunistic) in their orientation. But they are often contingent on the availability of enabling infrastructure including public transport and broadband connectivity. This aspect of the geography of innovation is still being played out.

2.8 'Copycat' strategy is unlikely to work

People attending the Forums and discussions and in interviews indicated a strong 'reality check' in relation to the ability to replicate the development of innovation hubs such as Silicon Valley, and Israel. The 'special case' situations of these places are becoming better known. Internationally there is a growing commitment to innovation in 'peripheral' locations, such as St Louis, and areas where there is strong grass roots innovation leadership and innovation champions.

One interviewee commented:

The joke in Silicon Valley is that every engineer is trying to recreate his mother. And the reason they say that is because you look at what's being built at the moment: it's car share services, butler services, food delivery services, washing services, cleaning services. They're not innovative. They're service-based evolution.

But Silicon Valley produced transistors and computer chips and ... Intel didn't go through a three-month incubator and suddenly say 'Oh, we got that x86 construction set'. They took decades. And lots of defence funding to build these companies that were going to last, and have lasted, for 50 years and longer.

There was discussion in the Forums about the attributes of innovation leaders and champions, how they emerge and are nurtured.

It was argued on many occasions that 'Australia is different' and needs to develop its own solutions. It was noted too that 'Australia isn't so bad' and 'We are a land of opportunity. We've got so much to do. 'Our expats build up Australia, in contrast to our domestic commentators'.

In the corporate world copycat strategy rarely works. There is potential to learn from some aspects of practice, but adoption and implementation must reflect institutional settings and histories. While many people advocated adoption of the Fraunhofer model of university-industry collaboration for example, others counselled caution and pointed to weaknesses in the model.

2.9 Commit to stability and continuity in policy and program initiatives

Throughout the consultations mention was made of the short-term commitment to innovation initiatives. An interviewee, with a career developed overseas, commented:

There seems to be a tendency in Australia if a government organisation is successful and there's a change of political leadership at the Commonwealth level, the first thing that the new leaders do is burn everything that was successful from the past.

One of the better features of the American system and of certain European systems is that there are institutions that are durable beyond the political electoral cycle. So, it is to be expected that the pendulum swings back and forth, and that the winners of the last election get to set the policy settings for the future but destroying institutional capability between elections. It is very damaging

According to the CEO of a prominent research centre, developing institutions and capability, and attracting people to move to Australia to build up knowledge in a certain area requires a long-term perspective.

The challenges of lifting Australia up out of a mining and extractive industries to value-added industries, to service industries and to the knowledge economy it's more than the three years, six years. it's a 20year cycle.

It was noted that Australian universities are 'a magnificent example of institutional stability'. It is a capability to be valued – in a context of resetting and aligning strategic directions in an environment of major change. Most Australian universities have a strong commitment to strategic planning in the areas of teaching, research, and engagement. There is, potentially, greater scope for realignment of these approaches with Government strategies in research and innovation.

An interviewee commented that the Australian government is unique in its attitude towards universities, reflected, for example, in the approach in the 2017-18 budget. There was a strong call in the consultations for the government, business, and research sectors to work as 'partners' and 'collaborators' in the economic, social and environmental development agenda. The *Expert Opinion Survey* overwhelmingly called for a bi-partisan approach to innovation policy.

3 Feedback on Achieving Innovation Outcomes

This Section links the messages from the consultations in relation to achieving ISR system outcomes. They are complementary to the key messages outlined in the previous Section in that they focus on actions and initiatives that might be reflected in the ISA's 2030 ISR system Strategic Plan.

The commentary covers the main areas identified in the consultations. Time and space has not made it possible to fully canvass the range and depth of views that were put forward at Forums and during interviews, and the knowledge and expertise made available.

3.1 Innovation is an investment

Small to medium businesses (SMEs) and Governments (particularly budget and expenditure control agencies) might see innovation as a cost, or an expense. Most SMEs work on cash accounting/cash flow basis which reinforces this perception.

For SMEs innovation competes with front of mind commitments such as making sales, collecting cash, and meeting payroll. Only larger businesses have capacity to see innovation commitments as 'investments' and incorporate them into their balance sheets and appropriately amortise them over time – subject of course to relevant accounting standards and taxation rulings.

This 'expense' approach also places pressure to realise returns from 'innovation' over a short time frame – such as within a financial year, or a quarter, or even a month. This is reflective of the *transactional* culture referred to earlier in this Report.

For Government, innovation should be seen as an infrastructure investment, in the same way as it approaches investment in national research facilities. An interviewee commented:

Innovation is not a cost, it's an investment. It's about identifying areas within what we're doing, that will generate a return. It is a high-risk investment, because there is no guarantee about it.

Innovation is not a program where we can say, 'We're going to push this number of millions of dollars and we're guaranteed this outcome.' It doesn't work like that. So, we still need to change our mindset about it, to think about it as an investment.

Many interviewees referred to a 'portfolio' approach that balances investments in basic research, applied research and translation.

3.2 Commit to an innovation vision

The Board has proposed a vision for Australia's innovation, science and research system:

Innovation, which can underpin a diversity of internationally competitive industries, will enable today's and future generations to have meaningful work, a great quality of life in a fair and inclusive society.

We want Australia counted within the top tier of innovation nations, known and respected for its excellence in science research and commercialisation.

There was general support for this formulation of words, although there was discussion about what constituted the 'top tier'. It was noted, however, that in 10, 15 years' time, the world will look different. 'Not because of what we're doing, or because of what we're not doing, but because we are part of much broader trends. The vision must be a moving target'.

3.3 Set innovation targets

There was strong support in the Consultations Program for setting targets. It was suggested that there is an oversensitivity in Australia to the idea that the government shouldn't pick a winning technology, industry or sector.

There was generally strong support for the Growth Centre initiative as a means to set targets. There was also support for their continuation beyond the life of the election cycle, and as a vehicle for the delivery of other strategies, such as R&D investment and Business Development Programs.

3.4 Think big, think global

A view emerged that, if we want to compete, and compete globally we need to invest on a large scale. It is a matter of addressing the questions of who do we want to sell to, what services do we want the economy to provide in the future and who's the market for that. It also means asking how much we can get out of a market of 25 million people, and how much could we get out of a market of three billion people?

An interviewee commented:

There are markets of 3 and 4 billion people where an extra 25 million people this year are moving from rural India and rural China to middle class India and middle-class China. The market size is doubling potentially, so what do you want to do about that? How do you want to turn the innovation towards that market? These are the sort of questions that interviewees would like the ISA Board to address. It also means asking the marketing question about which segments of these very large potential markets will be targeted.

3.5 It's not just high tech

There are many innovations, particularly in the social and environmental areas, that are not driven by high tech, but 'pull through' technology. Technology is the enabler – not the driver.

Previous technology booms have drawn attention to the risks associated with technology push solutions - envisioning a potential demand that is made possible by technological advances. Knowledge management as a professional practice largely failed because it was 'pushed' by technological possibilities.

There is some push back in the area of 'digital cities' and 'smart cities' where technological possibilities are getting ahead of demand and the uses that people are prepared to pay for - or for governments to invest in.

3.6 University role in driving innovation and industrial development

This is a complex area. Many participants were of a view that universities have tended to be very focussed on early science and not on applied science and commercialisation of research. This position has its supporters and detractors.

A view emerged in Consultations that universities should restrict themselves to discovery and invention – and should not be involved in innovation. This was an area of significance difference of opinion between university and business leaders. In reality, the relationship is much more nuanced, and varies across institutions and areas of research and fields of education. Effective collaboration links discovery, invention and innovation.

In terms of the engagement of the research system with users, it was said that 'many people including the Prime Minister have been pointing a finger at universities'. The reality is that Australian universities seem to be very able to collaborate with companies in the US and Europe, but are struggling to collaborate with Australian companies. Nonetheless, there is a strong view that in a knowledge based economy, universities have an important role to work with business, and where appropriate, stimulate industry development. This may include the potential for universities to take a lead in driving industrial innovation. An interviewee commented:

The most strident statement that the Prime Minister made on this was Australian industry is failing in innovation and universities are going to have to drive national innovation - which is an interesting statement from someone who comes from the commercial world to make. There's part of me that thinks 'that's a ridiculous thing to say,' and there's another part of me that says, 'well okay, if that's what the role of universities is going to be in Australia, that's fine' but then we have to get on with it and government's got to resource it so it can actually happen. Maybe that is the right answer. It's an odd answer in all sorts of ways but if it works, then maybe that's a good thing.

This would appear to be a pattern in lagging regions, such as Tasmania and South Australia, but its generality is more qualified elsewhere. Some of the more traditional universities are starting to think differently.

Whether that really translates into acting differently, or they're trying to look like they're responding to what government is thinking in the hope there's money in it, I don't know. The universities are starting on this journey, but you have to give them time because it's like a battleship. They move very slowly as you well know, but they're starting to do good things.

In the area of technology transfer there is an acknowledgement of a need to upskill technology transfer and commercialisation staff in universities and medical research institutes. It was argued that there is a significant skills gap that, without training and access to funding, independent of institutional funding, the performance of technology transfer and commercialisation offices will be constrained. A critical mass of experienced commercialisation teams is required to build capacity across the system.

The UK addressed this with third stream funding. One can ask the question as to how come UniQuest on behalf of UQ outperforms on every commercialisation metric under the National Survey of Research Commercialisation of any of the rest of the Group of Eight universities singularly and when they are combined. The answer is critical mass and training of an experienced team. Without the income from Gardasil or another blockbuster, no commercialisation office in Australia will be able to be funded at a level where it can contribute as significantly as UniQuest does to UQ.

Consultations indicated that other universities, including the University of South Australia, are making a major commitment to building capacity in technology transfer, including more 'business friendly' approaches to the management of Intellectual Property.

It was suggested in interview that public research organisations are constrained in making these investments in capacity building because of their inability to carry forward surpluses from year to year.

A parallel requirement is for people in senior executive roles covering engagement with industry to have skills in engaging with *both* people in business and with academic staff in faculties, schools and research centres.

3.7 There is a role for government

An interviewee noted that venture investors have only one funding structure, but added, that 'if you look at the most innovative venture investors over the last say 50 years in Australia, it's the Australian Government'. The Government bankrolled extraordinary developments across CSIRO and research. Most of the things that Australia is known for were government funded.

It was noted that we tend to say innovation must be funded by private venture investors. 'That is not our history, or the history elsewhere in the world. Government has a huge role to play there'.

3.8 The role of the military in leading innovation

The importance of Defence procurement in driving innovation was raised frequently in consultations and interviews. Anecdotes were relayed about the difficulty of connecting with the prime contractors and the challenges of meeting procurement criteria around risk. However, examples were related about how success is achieved through building confidence and trust.

The consultations indicated that in both the US and Israel Defence has been a major driver and enabler of innovation. This is far less pronounced in Australia. This relates to both technology development *and* personnel development.

The military has had an important role in developing leadership capability for Australian businesses. An interviewee commented:

I was in the army reserve. I couldn't do my job here without the skills I acquired there. There's a whole lot of things like I learnt about leadership in that role that I would not have learnt in the university. I think that Defence through ... both through its cultural leadership and investment in its people needs greater recognition.

In places like Wagga, Townsville, and Darwin, the military presence is considered to have a significant impact on growing the innovation ecosystem.
3.9 Demography, diversity, and inclusion

Australia's economic prosperity has been firmly embedded in an active immigration program, and is likely to continue to do so.

Immigration has the multiple advantage of sourcing skills and talent of people to work in growing businesses, start their own enterprise, and create demand for domestically produced goods and services. That demand has not, of course, been enough to sustain an unprotected manufacturing industry which failed to adjust to international competition when tariff barriers were removed.

Currently one third of Australian start-up founders were not born in Australia. We have a skill shortage, like right now and you know, we've just had a change to the 457 visas. There is a wealth of experience ... knowledge, expertise that we could be bringing to Australia to help build up our own innovation ecosystem and it would be remiss of us not to discuss it, or at least not to have it to be some discussion point.

... wouldn't it be fantastic if part of our immigration policy at some point is that, new arrivals into Australia have to undertake coding, or have to build up their technical skills.

And so, things like Techfugees, which is a hackathon for refugees, by refugees, creating technology services for refugees, is a fantastic example.

It was also argued in consultations that Indigenous innovation should also receive prominence. Innovation around the requirements of the aged and the disabled should also receive greater attention. These opportunities would come from a greater focus on design and design led innovation.

4 Feedback on Strategic Challenges Identified by the ISA Board

This Section provides feedback on matters raised in the *Consultations Overview* document. Each subheading refers to a Strategic Challenge identified by the ISA Board. Further information is provided in Appendix 4.

4.1 Moving more firms, in more sectors, closer to the innovation frontier

Situation

- Successful businesses have an aggressive and unrelenting focus on customers.
- Corporate, university and PFRA innovation hubs perform an important role.
- Too many firms rely on too many grants for business success. A culture of 'entitlement' has emerged.
- Rules/accountability based grants arrangements stifle innovation potential. This has also nurtured a grant writing industry.

Possible actions

• Encourage all businesses to confront and embrace competition – locally, nationally, and globally.

Too many businesses confront competition by seeking a government grant/subsidy. A sort of government 'business safety net'.

The R&D tax incentive is seen as critical for technology based businesses. Consultations indicated that many successful businesses have not received, or sought, government enterprise development grants.

• Knowledge and information for businesses to embrace technological innovation and 'go with' disruption.

There are many good examples, including in agricultural enterprise, such as cotton – the most productive growing industry in the world.

Acquire technical capability to work with new and sometimes complex machine based software and 'digital threads'. Training is critical. Current reliance on 457 visas. Effective use of robots on legacy machinery (e.g. for quality and precision in injection

moulding).

- Introduce outcomes based grants systems, managed on a peer review basis. Involve IGCs in funding investment support for businesses in their area.
- Support the education and training of 'truly commercial' business advisers and mentors
 Far too many great ideas are 'left on the cutting room floor' due to lack of access to truly
 independent and 'commercially oriented' advisors/companies/service providers, being
 available to help commercialise a viable idea and being focused to ensure it is a commercially
 viable success.

Peer to peer learning 'really gives the confidence to go out and innovate'.

- Respond to automation opportunities by innovating around business models that 'serve new customers in new ways'
 Opportunities in platform technologies for mass customisation for as yet unknown products and services. Creates high demand for software developers and continuous/lifelong learning.
- Build management and leadership capability in emerging and established businesses. 'It's leadership in the firms that's got to embrace innovation ... leaders must empower people to be better collaborators and for their firms to be better collaborators'.
- Build capacity for innovation in connecting with customers and end users In the 'experience economy' businesses must have skills in ways to influence 'hearts and minds' using traditional and new media, big data and analytics.
- Establish a clear link between design and Innovation 'On a daily basis, we prove that with a focus on design and innovation you can manufacture products here in Australia cheaper than the likes of China. We are re-shoring work from Asia all the time'.
- Capture opportunities in 'demand side' innovation
 Look at areas where demand is growing holidays, audio visual, eating out, ready meals, housing, etc.

Seek innovation in new marketing and trusted communication channels, particularly visualisation.

4.2 Moving and keeping Government closer to the innovative frontier

Situation

- Australian Government is not seen to have an innovation culture.
- Procurement system is compliance driven and risk averse.
- Opportunities for innovation through procurement are largely unexploited.
- Local Government can be a strong innovator but constrained by heavy legislative/regulatory oversight

Government sees itself as a procurer, not as a customer- I guess breaking it down into government as a customer and making it easier for government as a customer, but partnering with more innovative ... industries and businesses and making government as a customer and as an employer, more agile.

Possible actions

- Commitments to 'smart' government, public value creation.
 E-government commitment services focus (not just procurement).
 Smart/intelligent infrastructure.
- Unleash innovation potential in government departments and business enterprises. Innovation hubs – e.g. NDIA Assistive Technologies Innovation Hub.

Application and use of data, data science.

Some good examples – e.g. Australia Post with Star Track.

Develop appetite for risk and 'fail fast'.

- Apply knowledge and technology to 'break through' policy, compliance, process, and regulatory roadblocks [process innovation].
 BIM type systems are being used to establish connections between tender offer, evaluation, contract management and life cycle maintenance and renewal.
- Ensure that procurement is outcome based, solutions focused, and prioritises innovation.
 Much procurement is based on a 'contractor model' rather than a capability sourcing model.
 Encourage novel and disruptive approaches.
- Revitalise procurement/preferred supplier panels.
 Adopt a strategic approach to innovation sourcing. Identify capability with small projects with development potential through 'stage gate' approaches.

Insist that procurement builds national industry capability.

• Risk averse tender assessment processes have excluded Australian SMEs from participating in major tenders.

Purchasers should manage risk rather than avoid or exclude it.

New Defence processes are seen as a major improvement.

• Ensure that 'outsourcing' functions activities are driven by innovation as well as efficiency and cost saving objectives

Require the development of outcome based contracts.

 Much public scrutiny work is about 'gotcha' events around economy and efficiency – and process. Encourage focus on the other two elements of public value – effectiveness and appropriateness.

4.3 Delivering high-quality and relevant education and skills development

This topic was a major focus of discussion at the Consultation Forums and in interviews. It was an area where participants have had direct experience, and understand problems and possible shortcomings in education services delivery. There were many suggested areas for improvement and action which were all generally well made.

Discussions became a great deal more complex when addressing questions about *how* change could be delivered within the current institutional structures and cultures.

There was overwhelming support for developing an ethos and practice of lifelong learning and discussion about how this could be delivered.

Situation

- Students are entering Higher education (HE) with no prospects of getting employment (seen as a problem of course quality and excess supply).
- Many students enter HE with poor literacy and communication skills.
- There are significant funding imbalances between HE and Vocational Education and Training (VET).

- HE is partnering creatively with Registered Training Organisations in delivery of course modules in degree programs to delivery flexible learning programs.
- A 'class system' is seen to have emerged between HE and VET, which encourages courses to move, inappropriately from VET to HE.
- There are burdensome compliance issues in Vocational Education, which has motivated good educators leave the system.
- The idea of lifelong learning is currently seen as an aspirational goal, as opposed to something that happens often.

Possible actions

Create an education and training system that is fit for purpose.
 A system that is agile, flexible, responsive, and integrated, and meets needs for delivery of basic skills, for people starting a business, or going into employment, and addresses demand for lifelong learning.

Give focus to the demand side. Big data (from SEEK, LinkedIn, etc.) is rich source for understanding demand.

- Focus on all sectors in the education system.
 Reference was made to international developments, including the work that Schleicher at the OECD around education, with an agenda for change at the primary and secondary school system as well as the tertiary sector.
- Profile VET and technical education as having the same value as university education.
 This could also involve giving public TAFE greater independence and autonomy, as 'public organisations' like universities.
- Develop an education and training awards system that focusses on knowledge and competencies, rather than qualifications.
 Develop a nationally (and internationally) recognised 'skills passport' around the testamur and including extracurricular achievements (e.g. capstone projects).
- Encourage and facilitate greater movement of staff between the academy and industry. Remove barriers and blockages, including career advancement and IR issues.
- Build capacity for acquiring practice based management skills and mid-tier technical skills. Consultations indicated major gaps in this area. Blending of academic and occupational learning.

Consider moving from 'training packages' and competency based learning to curriculum based learning.

- Recognise the importance and contribution of private VET and private universities and scope for innovation in education and training delivery through these channels.
 Education is likely to be disrupted with opportunities and applications flowing from 'the Internet of Everything'.
- Incentivise small businesses to invest in training/ skills development through collaborations with education institutions.
 Disseminate best practice in WIL, industry placements, STEM in schools, be-spoke courses and practicums.

4.4 Maximising the engagement of our world class research system with end users

Situation

- There is strong collaboration between Business and Research sectors, but much of it is global. There tends to be a strong focus on outcomes and results.
- Research funding organisations have developed funding agreement documentation which is excessively legalistic and complex.
- Universities are leveraging property assets to facilitate collaboration on campuses.
- A significant momentum in capability and collaboration was created by the EIF.
- Several universities allow IP to be owned by industry partners.
- SME sector is problematic in building research and teaching partnerships, but there are examples of good practice.
- There is seen to be a very significant risk to university research if the international student market collapses for example:

We shouldn't pursue volume at the expense of quality. By traditional measures, Australia's research system is doing quite well in international metrics, it is well recognised as falling behind in its ability to generate impact. It's ability to translate that research, you know, those wonderful academic PhDs, or theses that sit on the shelf, into being commercialised, or turned into some benefit somewhere is a major challenge.

If you're looking at the international metrics on the number of university graduates, without even talking about the research, just the pipeline, China is producing probably 20 times or 30 times more graduates in one year, than we can produce in a decade.

So, the issue of volume may be quite a difficult one to address. So, then the question is, 'How do we address the issue of quality?' And if traditionally we do have the quality, despite our apparent volume disadvantage, then how do we translate that quality? How do we bring that quality into outcomes as opposed to letting it to sit on the shelf?

Suggested Actions

- Keep national focus on basic research in a 'portfolio' that also includes applied and translational research.
 Global businesses are known to identify, seek out, and connect with excellent basic research capability in universities.
- Build scale in research through meaningful institutional collaboration in research and translation.

For example, in the biomedical/bio pharmaceutical areas where Australia invests a very substantial amount in basic research across multiple institutions. Also, cybersecurity.

Encourage sustainability in university research investment.

Universities be encouraged to secure their future by prudent investments in capability for research. The EIF played a major role as a 'nation building' initiative.

CSIRO and other PFRAs be permitted to retain earnings (annual surpluses) to invest in future capability.

- Establish an 'investment' approach to funding research and innovation, as adapted and applied in the EIF program.
 Investment based strategies can create a clear link between 'funding', outcomes, and results.
- Establish clear links between Innovation Investment and National Research Priorities. Consultations indicated these are only loosely coupled.
- Create a national standard for IP management.
 Approaches differ across universities. Industry tends to be unhappy with IP ownership staying with universities. Several universities have departed from this.
- Create simple, straightforward, nationally endorsed templates for collaborative investment agreements (objective: no more than two pages).
 Complex legal agreements and drawn out processes and are a major disincentive for businesses engaging with universities. Develop 'business in a box' type system of templates.

Create 'pathways' for SMEs from advice and consulting to research projects. E.g. UoW Facility for Intelligent Fabrication.

 Identify and promote best practice for the formation and governance of university research centres, institutes, and joint ventures.
 Research centres are key instruments for effective collaboration. Practices and procedures for formation and dissolution vary widely.

4.5 Maximising advantage from international knowledge, talent and capital

Situation

- Businesses cannot acquire the skills and capabilities they require. Many have turned to S457 visa arrangements.
- Encouraging talented people to locate to Australia involves a 20-year time horizon.
- Mobile workers [digital nomads] are able and willing to work from anywhere.

Suggested Actions

• Leverage the international mobile workforce.

The global mobile workforce is set to increase from 1.32 billion in 2014, accounting for 37.4% of the global workforce, to 1.75 billion in 2020, accounting for 42.0% of the global workforce. Is there a need to have talent physically located in Australia? Estonia has a program called 'E Residency.

- National scholarships for talented business leaders to undertake executive programs at global business schools.
 In addition to tuition, builds global business connections through alumni networks.
 May require 'golden cufflink' assurance.
- Encourage and welcome the return of managers and leaders with international corporate experience.

Too often people with international experience expected to 'step back' into a risk averse and 'complacent' Australian management and corporate culture.

- Universities to maintain ongoing contact with international alumni. Universities can assist in maintaining contact with talent through retaining electronic contact in relation to skills access (and not only philanthropy).
- Build the national skill base by supporting more women and minority groups into tech, innovation.

That is something that we can do closer to home immediately.

4.6 Building capacity/capability in regional innovation ecosystems

This was not identified by the Board as a strategic challenge – but was an important issue in Consultation Forums conducted in regional Australia.

Situation

- Australian Innovation system is a summation of many regional and local innovation ecosystems.
- Robust ecosystems are globally focused and locally engaged.
- International research and practice suggests that 'clusters work'. Connectivity and learning is critical for innovation.
- Sustainable ecosystems require large lead businesses and universities with a disposition to expand and invest.
- There is a great deal of promotion of innovation ecosystems and collaboration, but far less material about outcomes, impacts, and results.

Suggested Actions

- Develop a national approach to support the development of regional innovation ecosystems through an innovation oriented regional policy.
 Ensure a consistent and coherent policy and strategy within and between Governments. EDV approach has merit.
- Promote investment in research, talent creation, and enterprise development on an 'ecosystem' basis.

For example, the Optoelectronics initiative across three universities in South Australia. Requires intergovernmental and interagency collaboration in investment strategies.

• Encourage formation of research translation precincts that focus on commercialisation Involvement of universities/research organisations, VET, schools, large anchor corporations. Supportive statutory (land use) planning [as well as] money can be significant. Universities have recently been active in campus development around this action. University campuses can become 'public spaces' for connectivity and collaboration.

- Develop a national performance monitoring system that provides metrics on outcomes and impacts for precincts/innovation districts/hubs.
 Currently there is a great deal of data on activities and outputs, but investors want to know about results, and how they have been/can be achieved.
- In collaboration with universities, states and local governments, establish good practice 'light touch' network governance frameworks for regional innovation ecosystems.
 Aim to develop regional innovation ecosystem strategies, establish priorities, build entrepreneurship, report achievements and account for investment of public funds

Look to understanding local and global knowledge flows and learning processes, and the interaction effect of civic capital and local institutions in supporting the development of a local 'learning economy'³.

4.7 High impact, large scale initiatives to stimulate system innovation

The last component of the Consultations Program agenda outlined in the Overview Paper was to identify high impact, large scale initiatives that would stimulate system innovation. One basis of the consultations, the highest priority areas for major strategic initiatives reflect the following considerations:

- Establish a bipartisan approach to innovation that is long term.
- Create a world class and competitive National Digital Connection capability.
- Establish Energy Security as a priority to drive and execute innovation opportunities.
- Leverage Big Data, technology platforms, and research infrastructure.
- Place Design Excellence and Design Thinking at the forefront of innovation strategy.

The desire for a bipartisan narrative coming from the workshops, forums and interviews was overwhelming.

³ BRAMWELL A., NELLES J. and WOLFE D. A. (2008) Knowledge, Innovation and Institutions: Global and Local Dimensions of the ICT Cluster in Waterloo, Canada, Regional Studies 42, 101-16. 0.1080/00343400701543231

5 Transitioning: Laying the Foundations for Australia's Innovation Future

In this Section, views and opinions from the consultations and interviews on how to *achieve* the Strategic Challenges and large-scale initiatives identified by the Board in the *Issues Paper* are outlined.

5.1 Overarching 'system wide' issues

Set out below are overarching matters that arose during the consultations and were seen as important for Australia's innovation future. Many of these matters are well known and have been canvassed previously in many forums and in papers prepared for government and industry. But they remain important in developing actions for delivering Australia's Innovation Future.

Whilst it is relatively easy to identify the 'problems', developing and implementing the solutions is, of course, is much more complex. It would inevitably involve additional and reallocation of public sector resources and a significant attitudinal, behavioural and institutional change which can only be approached over the longer term. *A strategically driven, evidence based, communication strategy is essential in this context.*

During consultations, participants were constantly challenged about implementation. In many situations, understanding, accessing, and pulling the 'policy levers' was identified as a complex area. It would require intense cross institutional collaboration and commitment. This means establishing priorities and quantifying the return on investment (results and impacts) that a heavy resource commitment would deliver.

5.1.1 Build connections and connectivity

As observed earlier in the Report, building connections and connectivity emerged as a very strong message in the Consolations. Comments included:

- 'Where all in this together'; 'We must all pull in the one direction'.
- Utilise the new network forms that are emerging, particularly around social media.
- Create 'space' for connectivity.

5.1.2 Remove the 'brakes' on innovation

Consultations revealed a portfolio of 'brakes' on innovation. These included:

- Digital connectivity, which is seen as a very serious issue.
- Red tape restrictions, multiple approval points, compliance.
- Work practices and embedded institutional behaviours.

5.1.3 Support innovation in regions on the basis of sound investment propositions

The consultations indicated that regions *are* important. Comments included:

- Combine 'bottom up' and 'top down' approaches.
- Avoid categorical 'grants' programs.
- Ensure that government agencies with a regional presence and impact collaborate to secure resources for investment.

5.1.4 Create a professional role for innovation intermediaries

The useful role of expert and independent intermediaries in facilitating university-business and business-business engagement over innovation has been identified as an important issue to connect people and organisations in the innovation system. Previous experiments funded by the Commonwealth in this area did not match up to expectations and deliver a return on investment.

There was a strong view that this area should be revisited, but intermediary arrangements should not be connected to the delivery of or access to some form of government grant or capturing commissions. This creates a challenge for program design.

5.1.5 Develop an appetite for risk

Innovation inherently, is about taking risk. This is now a difficult issue in Australia which has historically developed on a culture of 'having a go'. Investors and financial institutions tend to have a low appetite for risk, unless it can be secured over other assets, including intellectual property.

Desirably, approaches to risk should involve mitigation and management – not avoidance. This means developing a good understanding of current, future and potential risks. Risk also has behavioural, reputational, and financial implications.

For small businesses, costs of insuring against risk can be prohibitive – in circumstances of natural disasters and failure if customers to meet their credit obligations. And it is not possible to insure against the risk of *failing to find (create)* customers.

A common way to mitigate risk is to move slowly and progressively build on achievements and results. This takes time, resilience, and patience. The site visits indicate that innovative and entrepreneurial businesses take time (many years/decades) to achieve sustainable results.

The consultations involved talking to many people who had taken risks, and succeeded in their innovation initiatives, as well as others who had, and are, persisting with their innovation vision.

5.1.6 Address the 'trust deficit'

Consultations indicated that there is a 'trust deficit' across the system. This starts with a loss of trust in our politicians⁴ and works its way through business elites and impacts the innovation ecosystem. Reversing this deficit must start at the top – with our political leaders.

Transactional approaches to business-university relations rarely embed trust. The expression 'people do business with people they trust' came up frequently in Consultations and interviews.

5.1.7 Address the 'crisis of confidence'

Participants and interviewees referred to a 'crisis of confidence' among innovators and potential entrepreneurs. There are many reinforcing behaviours:

So, you're a student who's finishing year 10, who's about to go and decide what they're going to do if they're ... and thinking about their ATAR, thinking about getting to university. They drop out of maths, because it's been put in the too hard basket. You know, it's going to be harder to get the ATAR, to do the thing that I want to do, because maths is harder ...

Confidence comes from mentoring and support from families, trusted colleagues, advisers, collaborators, *and customers*.

5.1.8 Work towards a national innovation narrative

This need for an innovation narrative emerged throughout the consultations. Narratives are 'stories' about our innovation culture that must be seen as authentic and representative of our past and provide an aspiration for our future. A narrative should not overstate achievements through selected anecdote, as there are always downsides – such as the Sarich Engine.

In consultations, many participants drew analogies with our sporting culture and achievements. That narrative is very much about aspiration dedication, hard work, and long-term commitment. It is also about team work and deep-seated support from family, friends, competent coaches, teachers and mentors. It has also been associated with 'grass roots' investments in building capability at an early age and at school, community and regional level. Narratives can also become corrupted through organisational politics and the impact of vested interests.

⁴ See also Sam Crosby, 2016, *The Trust Deficit*, Melbourne University Press.

The sporting and cultural analogy suggests that Australia has a fair way to go in developing the supporting infrastructure and institutional settings for a robust innovation narrative. So far, commitments to developing early stage companies has been intermittent, short-term, and subject to frequent change. Changes to the Australian Institute of Sport represent a case in point. Currently, innovation responsibilities are highly distributed across departments, agencies, States and Territories. The 'signal to noise' ratio from the professional, industry and lobby groups is low.

Consultation sessions also raised questions about who should 'own' the innovation narrative. This should be seen as a cue for Innovation and Science Australia.

Building a narrative is not about 'telling', or even 'selling' the innovation imperative. It will be achieved by demonstrating that a commitment to innovation is important for Australia's future. It will follow from the <u>strategies and actions</u> of business, academic, and government leaders as being seen to be innovative

5.2 Reinforce an 'entrepreneurial mindset'

Consultations indicated that entrepreneurship is a national resource. It is a set of attitudes and behaviours that drive innovation and business creation. It concerns start-ups, new businesses, and mature businesses entering new markets and diversifying product and service range – particularly in the light of disruption and global change.

5.3 Encourage the development of leadership capacity and teamwork

Leadership is a resource for innovation system growth and development. This came through strongly in consultations. The requirement was referenced across sectors:

- Business the Board and executive leadership required to grow and sustain firms.
- Government a strong view from the consultations that *Governments, and Ministers*, must show greater leadership and commitment to innovation.
- Community grass roots leaders who can marshal resources for innovation investments and lead communities along an innovation journey. There are no prescriptions. Leaders can emerge in Local Government, NGOs, leading businesses, consultancies, and universities. But they have a capacity to project an innovation aspiration and the outcomes that follow.

5.4 Ensure new and growing businesses have access to capital

An interviewee commented, refreshingly, that in order to sell goods and services to customers, and create profit, *businesses need capital*.

You need capital to enable you to afford to do the research, afford to go to make prototypes, to develop marketing plans, to hire people. You

need money. And so, unless you can capital, there is very low likely hood of you getting to innovation.

This is seen as a problematic issue for a lot of people because they don't understand how capital functions, the people who control it, and what their requirements are. 'People who obviously control capital tend to want to make money too. So, unless you're putting forward a plan that takes you to revenue generation, you don't get the opportunity to raise the cash'.

Nevertheless, as I say to a lot of people, 'If you run a business, your fundamental nature is that you're a capitalist. Get over it. Move along. The objective is to make money.'

So, but my objective is to make money and to do things that are useful to the community and that are to the planet as well and that of course also satisfy my shareholders.

At the same time, many businesses finance their growth through cash flow. Trade credit also a significance source. It was submitted in interviews that new bankruptcy laws may limit this form of capital and constrain new business growth.

There are of course, thousands of lifestyle 'businesses' which people may even run at an accounting loss, that support hobbies and pastimes. There are also 'businesses' that service contractors establish to manage their financial affairs. These should not be within the ambit of innovation policy.

5.5 Address availability of commercialisation capital and quality of IP Management

A feature of the Australian commercialisation landscape is said to be the relative abundance of later stage venture capital. In correspondence with a Forum attendee it was pointed out that 'propelled by the Federal Government's National Innovation and Science Agenda we now have nearly a billion dollars on new additional funds':

- \$200m CSIRO Innovation Fund.
- \$500m Biomedical Translation Fund managed by Brandon Capital, One Ventures and Bioscience Managers.
- \$200m National Universities Innovation Group Fund with the Group of Eight Universities and the UK's IP Group.

The majority of this capital is directed towards follow-on investments. This was a capital gap that was highlighted to Government through the experience of Fibrotech, Hatchtech and particularly Spinifex Pharmaceuticals. It is argued that this gap has now been filled.

5.5.1 Access to seed and early stage investment funding

The Expert Opinion Survey pointed to a gap in the seed and early stage investment categories. This is an important area to address in terms of laying the foundations for Australia's innovation future.

In response to the proposition that 'access to seed and early stage investment in innovation is adequate', only 9.8 percent of business respondents, and 9.9 per cent university respondents agreed or strongly agreed. This is indicated in the Figure 5 below.



Figure 5: Access to seed and early stage investment in innovation

In consultations suggestions were put forward for a *National Innovation Fund* to address a funding gap at the early stage, *particularly for university and research organisation commercialisation opportunities*.

It was pointed out in correspondence that:

- Intellectual property as a tangible outcome of competitive grant funded-research is inherently immature and the investment market will generally not invest at this early stage. There are few grant schemes beyond ARC Linkage and NHMRC Development which target the establishment of commercial proof-of concept and the timeframe of these grants is not suited to the majority of commercial opportunities in this setting.
- Investments at this stage bear the greatest risk and fall to the university and their technology transfer and commercialisation officers to fund. This is not at scale and is only available on at best an ad hoc basis across some of the Group of Eight universities. The net result is that a significant number of commercial opportunities from grant-funded research are squandered.
- Access to proof-of-concept funding remains the most significant barrier to the effective commercialisation of university and associated-medical research institutes intellectual property. The creation of a National Proof-of Concept Scheme which would be light touch and locally administered would be a very desirable intervention with considerable, quantifiable benefit to the National innovation landscape.

5.5.2 IP Management

The Expert Opinion Survey points to unevenness in the quality and direction of IP management across the university and research sector. Business is looking for consistency and simplicity, while academic staff are looking for standardisation and guidance. An interviewee, with international experience, commented:

Today I was looking for the 'plain vanilla' model non-disclosure agreement. I had an engagement with a fellow who came to visit the University from a textiles company down in Melbourne and he said, 'I want an agreement that's only on one page.' And I was trying to find our agreement thinking that four, five pages was sort of the minimum.

I couldn't find the agreement. And I've called the technology office, I've emailed them, I've said, 'could you just send me the plain vanilla agreement?' No agreement. I go online, I can download Harvard's, I can download Stanford's. I can download Harvard's and they've conveniently highlighted with Adobe Notes, 'insert here the whole list of all the technologies'.

So, the agreement—the secrecy agreement in Australia itself is a secret. That is not good. And that either means that somebody is the controlling gatekeeper in the university and doesn't want anything to happen unless they can control it, but other highly innovative worldclass research institutes are freely willing to give it to me when I'm working at a university. And I'm one of the good guys, I'm on the same team. That's a problem.

Whilst this anecdote is not saying that this issue is universal across the university sector, it is indicative of concerns expressed during consultations and interviews about IP management.

5.5.3 Industrial PhDs

Consultations and interviews called for the general introduction of 'industry-related' PhD programs. Interviews indicated that these are well in place across the university sector, particularly in the ATN Group, Swinburne and UNE, although further initiatives could be instituted. There would be benefit in dissemination of practice experience, both in academic guidelines and business experience with PhDs.

The site visits indicated several successful practices and initiatives in this area.

5.6 Invest in formation of skills and talent for innovation.

As indicated in Section 4 above, this area occupied a very significant amount of time in consultations and interviews. Although the strength of opinion was not tested in the *Expert Opinion Survey*, it is apparent there is not a great deal of consensus on how to address the problems identified. Many of the problems also emanate from institutional patterns and structures that are not readily apparent.

For example, while many people observed that graduating students were ill prepared for the workplace, others commented that they welcomed the fresh thoughts, curiosity, and digital competence that was emerging from the universities and VET colleges.

The areas covered in consultations and interviews covered:

- Instilling innovation attributes in K-12 Education (at great length).
- Digital literacy and soft skills, including problem solving and creative skills.
- Building the technical skills base and the performance of public VET.
- The role of private VET.
- The Australian Qualifications Framework.
- Integration of occupational and academic learning, including pathway programs between VET and higher education.
- Developing capability for curiosity.
- Lifelong learning and micro credentialing.
- Access to international talent pools.
- Internships, work-integrated learning, capstone projects.
- Gap years in industry, domestically and internationally.
- Lifelong affiliations with universities and graduate schools.
- The potential from culturally diverse community.
- Opportunities and challenges in the freelancer economy, including putting people in charge of their careers.
- Challenges in areas of socio economic disadvantage.

5.7 Encourage investments in transport and communication infrastructure

The Forums and Interviews drew attention to requirements for supporting investments in communication and transport infrastructure. This is an essential component of Connectedness referred to above. The CEO of the Committee or Sydney commented at an event during the consultations period:

For innovation to be fostered, infrastructure needs to be available. Many regions across Australia and even cities, suffer from poor transport. Keep expanding Sydney? People will have to travel someday, there'll have to be transport, there has to be ... much more communication required, internet options. We have a lot of that, but we need to keep working on it, because the requirements right now, won't be the requirements in 2021 or 2030, so ... that's how we can germinate innovation.

The requirement for a world class national digital connectivity network has been canvassed throughout this Report.

5.8 Build collaboration, cooperation, and partnership

This area also occupied a great deal of time in Consultation Forums and interviews. It is widely acknowledged and appreciated that collaboration is vital for Australia's innovation future – but there are important issues to address about how to set up and sustain viable collaborations that achieve results.

Some matters that arose in consultations are canvassed below.

5.8.1 Research centres, institutes, and foundations

The importance of collaboration has been well made. Less well understood are issues concerned with collaboration governance. This matter was raised often during Interviews.

The CRC model is well regarded and is seen as a 'premium' model of collaboration. The CRC-P initiative is welcome and has had high take up. There are other potential models, and there are opportunities to be innovative in the way that collaborations between research and industry are built.

There was a view that universities should change the way they think about collaboration. Currently, most universities have guidelines and procedures for setting up university 'designated research centres', and approved research centres, and then there are processes and procedures to setup institutes and other centres. Such arrangements may not be sufficiently flexible and agile to accommodate new and emerging collaborations.

There was a view that governance and structural arrangements for collaboration should reflect the strategies, aims and objectives of the arrangement, and not get in the way of achieving outcomes. There has been very little evaluation and discussion of best practice in this area. Reference is often made to the German Fraunhofer Institutes, UK Catapult Centres, and the US CRADA arrangements, but often giving little attention is the structure, governance and management arrangements and the institutional setting they are placed in, and which contribute to their success.

5.8.2 Incubators, accelerators and co-working spaces

The consultations and interviews indicated strong support for incubators, accelerators, and other forms of co-working. They are operated and/or sponsored by universities and research

organisations, profit and not for profit organisations, and property developers. They also perform an important social function. Moreover, they are not just for young millennials.

Consultations indicated that incubators tend to focus on trying to discover a new use for an existing platform or foundation technology, like another Uber or another Airbnb or food service area by developing a new 'App' or 'game'. Like popular music, some may end up being 'hits'. However, there is also a need to focus on breakthroughs, discovering new technologies, and new ways of creating value, including social value:

There's a lot of focus on currently and ultimately reskinning solutions to old problems, and making them sexier and better and easier to use and things like that. And there is a place for that, but as we commoditise technology, it becomes harder and harder to differentiate and so yes, you can get some initial traction, but you have no long term sustainable advantage because everybody else can do the same thing as you at very low cost, with no barriers to entry.

There are numerous stories about how innovations emerge from people working together in their 'college dorms', garages, and other accessible spaces where people can meet easily. But, innovations also emerge in research centres and corporations where a strategy of encouraging innovation through a well-established 'ideas, experiments, ventures' approach⁵. Multinational corporations establish incubators as way of bringing ideas in from outside, and there are many operating in Australia.

The message is that there is no one best way, and it is important to acknowledge what works, and look systematically at the results and returns on investments.

5.8.3 Engaging with established firms

The importance of collaboration arrangements connecting with established businesses was raised on many occasions in the consultations.

⁵ For example, JOLLY V. K. (1997) *Commercializing New Technologies: Getting form Mind to Market*. Harvard Business School Press, GANGULY A. (1999) *Business Driven Research & Development*. Palgrave Macmillan.

5.8.4 Promote the importance of innovation networks and networking

Strong networks are considered by participants to be a critical resource for innovation. Feedback from consultations and interviews regarding the importance of networks and networking has been referred to in earlier parts of the Report.

Research and practice suggests that, to be successful, networks require a mission and purpose, over and above meeting to discuss and exchange views. Commitment to specific projects that specify outcomes and results to be achieved are often a mark of success.

5.9 Leverage capabilities across the innovation system

The capacity to leverage practice and achievements across the innovation system is considered to be an importance focus of attention. Leverage covers opportunities in:

- Businesses leveraging capacity in research and teaching organisations, particularly in relation to facilities and equipment and students. There was strong support for improving access to facilities in the *Expert Opinion Survey*.
- Build on success in strong and growing sectors, such as tourism, property, finance. These
 sectors have the potential to adopt and apply technologies developed in other sectors, as
 well as providing insights and possibilities for new ways of addressing problems in other
 sectors.
- Leverage across programs, such as the industry Growth Centres Program, rather than introduce new and separate initiatives.
- Leverage international connections, particularly through connections made with international students.

6 Conclusions

This Section draws together material from the consultations and interviews, canvassed in the Report into a number of areas that might be considered in the development of the 2030 Plan.

6.1 Addressing innovation system outcomes

It was proposed during the Interviews with innovation leaders that 'if you can think of innovation around outcomes and then work back you've got a better chance of coming up with a more improved, ecological model of innovation rather than a system or linear model of innovation'.

The question was also raised about how to think about outcomes: 'should our outcomes be focused more these days on not just a robust, export-oriented mining sector and an emerging competitive advanced manufacturing sector as our traditional manufacturing base erodes rapidly, or should we be thinking about innovation outcomes around inclusion, around the future of whatever we can do to prepare for the future of work around big shocks such as climate change, innovation and disaster management for example'.

It was suggested that thinking about these outcomes might frame the next generation of innovation thinking.

6.2 Innovation system governance

The Governance of the Australian innovation, science and research system is complex. Innovation and Science Australia has an important role, through the 2030 Plan, to guide and facilitate innovation system development and growth.

ISA are not necessarily distracted by being required to execute and deliver programs. It has a critical role however, in advising and making the business case for new program directions, resourcing, and evaluation.

6.3 The level of investment in science, research and innovation

There was a concern, expressed throughout the consultations, that the resources available for innovation were not large enough to make a significant impact.

Over the 12 years 2005-2017, a total of \$104 billion has been invested in science, research and innovation. Of that, 25 per cent has been allocated to tax incentives, 21.7 per cent to organisations such as the CSIRO, 19.3 per cent for universities, including the block grant arrangements, and 10.7 percent for health. This is indicated in Table 1 below.

 Table 1: Commonwealth budget allocation to innovation, science and research by socio-economic categories, 2005-2016

Socioeconomic category	Total expenditure 2005- 06 to 2016-17 (\$m)	Proportion of Total (%)
00. Tax incentives	26,018.1	25.0
00. Multiple research categories	22,613.9	21.7
01. Exploration and exploitation of the earth	2,033.1	2.0
02. Environment	673.9	0.6
03. Exploration and exploitation of space	375.3	0.4
04. Transport, telecommunications and other infrastructures	122.3	0.1
05. Energy	2,309.3	2.2
06. Industrial production and technology*	7,241.8	7.0
07. Health	11,107.9	10.7
08. Agriculture	4,286.4	4.1
09. Education	9.7	0.0
10. Culture, recreation, religion and mass media	4.4	0.0
11. Political and social systems, structures and processes	1,095.8	1.1
12. General advancement of knowledge – block grants for universities	20,158.5	19.3
12. General advancement of knowledge - other	926.4	0.9
14. Defence	5,148.9	4.9
Total inactive programs	104,125.7	100

*Includes \$2.1 billion for Automotive assistance (2.0 per cent of total SRI expenditure) and \$2.1 billion for Cooperative Research Centres Program (2.0 per cent)

There was consistent questioning in the consultations and interviews about the extent to which this has represented the best allocation of resources to achieve innovation outcomes.

6.4 Towards an integrated Innovation System Budget and Plan

Innovation priorities need funding. There should be an arrangement to identify scope for identifying lower priority and underperforming areas and reallocation of resources according to priority. It is also important to resist temptations for 'one-offs', unless there has been an *investment fund* that operates to support high priority, high return projects, for which there is an investable business case.

The expenditure reported above is an aggregation of expenditure programs that fall within the responsibility of more than a dozen portfolios, each making allocations from their own funding envelopes. There is no mechanism for prioritising and reallocating expenditure identified as 'innovation, science and research' according to strategies and plans developed by Innovation and Science Australia.

Suggestions were made during consultations that the 2030 Plan should be accompanied by an innovation, science and research *Budget*. An acceptance of a process for re-allocating resources for innovation, science and research would be a difficult, but potentially worthwhile exercise in terms of maximising the returns from the scare resources available.

6.5 Long term commitment

As mentioned through this Report, long term policy and program commitment is seen as essential for the future development of innovation capability and outcomes in innovation, science and research.

Innovation, science and research investment creates *national infrastructure assets* that are available for ongoing use into the future. It should not be seen as 'funding' or 'expenditure' which carries a connotation of cost, and can be readily cutback in the pursuit of budgetary savings and fiscal balance.

It is understood that Infrastructure Australia is examining potential investments in teaching and research infrastructure.

6.6 Communication and engagement

Mention has also been made of the importance of an Australian innovation narrative. The narrative must be seen as authentic and a focus for future commitment to innovation. It must avoid attention grabbing PR messages. Messaging must also make effective use of social/new media.

6.7 Measuring success

An important aspect of strategy and strategy implementation is knowing when success has been achieved. This involves putting in place measureable outcomes, including value created for business (shareholders, management, employees and customers), industry, and the broader economy. Innovation should also be expected to create *public value*, in terms of social well-being, and the protection preservation and repair of natural capital.

An important aspect of measuring innovation success is through appraisal of a well-articulated *pathways to adoption*.

6.8 Capture the benefits of prior investments, have patience, and learn

Innovation strategy should capture the returns of past investments – for example the large investments over many years in medical research, agriculture and mining. A significant proportion of this has been supported by Commonwealth and State Governments. It has taken many years for outcomes and of this to be realized, with impacts across industry and in areas where Australia has a competitive advantage. The wine industry has been a standout example.

The *Expert Opinion Survey* suggests that these investments should continue. However, it is important to make investments in areas that are considered to be important to Australia's future

and where we can build competitive advantage and distinctiveness – particularly in areas where our global competitors will find hard to replicate.

The EIF (HEEF) had a major impact in providing Infrastructure, and the returns now being seen as current campus tours will validate. But the program has been largely forgotten and it has never been evaluated.

Universities are investing their surplus on teaching, leveraging their property assets, and coinvesting with business and government to create world class infrastructure. Some of this has been in place for many years, such as the Australian Animal Health Laboratories, which makes a critical contribution to food security.

It follows that innovation strategy must build on and extend capably investments; hold the line on programs and projects; invest prudently for the long term; wait and see how they pan out; outcomes may not be what was planned/envisaged.

Stories and narratives about success and impact are an important aspect of building a sustainable innovation strategy.

6.9 Innovation system research

Innovation research is currently highly distributed across universities, consultants and think tanks. However, it lacks resources and commitment and connection to a national innovation strategy. Economic approaches provide an important capability, particularly through the Office of the Chief Economist in the Department of Industry, Innovation and Science. But there is a need for research to be focussed on developing a comprehensive understanding of how and why businesses invest in innovation, the incentives and motivations, the management and governance capacities and capabilities.

At the same time, there is a wealth of knowledge contained in the surfeit of innovation statements, reviews and inquiries conducted over the last 25 years. This material raises numerous issues not only in innovation policy but also in related policy areas, including industry policy and trade policy, and in particular, the practice of public administration.

Much could be learned from this material, including the related submissions and papers prepared as input to this work.

Appendix

1. Public Submissions to 2030 Strategic Plan Issues Paper

Submissions made to the Office of Innovation Science Australia are subject to the conditions outlined in the privacy agreement accepted by each respondent.

A total of 130 respondents provided a formal submission. Of these, a number of respondents lodged confidential submissions; the details of these submission are therefore not included below. However, all submissions were included in the analysis of this consultation.

2026 Spatial Industry Transformation and Growth Agenda Team Academy of the Social Sciences in Australia ACM Administrative Centre Australian Advisory Board on Impact Investing Advanced Manufacturing Growth Centre Anderson, Nathan ANZA Technology Network Association of Australian Medical Research Institutes Association of Heads of Independent Schools of Australia Australian Trade and Investment Commission Australasian Open Access Strategy Group Australian 3D Manufacturing Association Australian Academy of Science Australian Academy of Science National Committee for Data in Science Australian Academy of Technology and Engineering Australian Academy of the Humanities Australian Brain Alliance Australian Chamber of Commerce and Industry Australian Council of Engineering Deans Australian Genomics Health Alliance Australian Institute of Marine Science Australian Marine Sciences Association Australian Mathematical Sciences Institute Australian Nuclear Science and Technology Organisation Australian Private Equity & Venture Capital Association Limited Australian Research Council Australian Technology Network of Universities Barker, John Blue River Group Brown, Paul Bushfire & Natural Hazards CRC

Business Council of Australia Centre for Culture, Ethnicity & Health Cheever, Paul Coffey, James The Action Learning Institute **Cotton Innovation Network** Council of Australasian Museum Directors Council of Rural Research and Development Corporations CSIRO Dalton, James Department of Defence Department of Industry, Innovation and Science DocuSign Australian Early- and Mid-Career Researcher Forum of the Australian Academy of Science Ecological Society of Australia Foundation for Young Australians Freese, Imo Geoscience Australia Gerard, Wayne Greg Herbert Human Factors and Ergonomics Society of Australia Inc. Huxtable, Paul Huxtable, Paul Huxtable, Paul Huxtable, Paul Ideapod Innergise Pty Ltd **Innovative Research Universities** James Cook University Knowledge Commercialisation Australasia Keenan, Sam Khanna, Rajiv Lancman, Katherine Leaver, Sean and Potts Jason

Yee, Rebecca Lester, Diane Madjeric, Lou Melbourne Genomics Health Alliance Murdoch Children's Research Institute Nasrin, Sultana National Association of Steel-framed Housing Inc National Centre for Vocational Education Research National Committee for Chemistry of the Australian Academy of Science National Committee for Data in Science of the Australian Academy of Science National Committee for Physics of the Australian Academy of Science National Farmers' Federation Naumovski, George Navitas National Energy Resources Australia Noble, David; Charles, Michael B; Keast, Robyn Office of Science, Department of the Premier and Cabinet, Western Australia **Queensland Chief Scientist** Optus Pearcey Institute Plant Biosecurity Cooperative Research Centre Professionals Australia **Regional Universities Network Research Australia RMIT University** Robinson, Phil

Science & Technology Australia Sedgwick, Geoff Smith, Lizzy South Australian Science Council Space Industry Association of Australia Joish, Sripadaraja **StartupAUS** Surtees, Tony Swinburne University of Technology TAFE Queensland TechSydney The Council of Australian Postgraduate Associations The Council of Australian University Librarians The George Institute for Global Health The Group of Eight The National Committee for Space and Radio Science of the Australian Academy of Science The University of Melbourne The University of Sydney Universities Australia University of New South Wales University of Newcastle University of South Australia University of Tasmania University of Technology Sydney UTS Business School, University of Technology Sydney Victorian TAFE Association Water Services Association of Australia Zheng, Jihua

2. Interviews with Innovation Leaders

*indicates meeting arranged by Business Council of Australia

Adamek, Petr, CEO, CBR Innovation Network Aithen, MaryAnne, Excutive Director, Research Office, La Trobe University Amour, Angus, BCA, Business Council of Australia Arnold, Jenifer, Head of Solution Centre of Excellence & Demand Management, SAP* Austin, John, Economist (contractor), Infrastructure Australia Bagga, Karen, Programme and Project Management Consultant, Informed Professionals Bailey, Fran, Chairman, Animal Aid, Victoria Batainah, Hala, Federal Director, Microsoft Bement, Jason, Optus Ben-Meir, Mr Doron, Vice-Principal (Enterprise), Chancellery, The University of Melbourne Berry, John, Director and Head of Corporate and Regulatory JBS Australia, JBS* Biggs, Professor Simon, Executive Dean, Faculty Engineering, Architecture & Information Technology, The University of Queensland Blackhall, Lachlan, Co-founder and CTO, Reposit Power Blatch, Professor Greg, Pro-Vice-Chancellor (Research), University of Notre Dame Boyle, Professor Brian, Deputy Vice-Chancellor (Enterprise), The University of NSW Brinson, Ashley, Executive Director, The Warren Centre for Advanced Engineering Brown, Matt, Deputy CEO, Group of Eight Universities Buculo, Sam, Professor Design and Innovation, University of Technology, Sydney Bullock, Matt, Spinify, CEO / Founder, Entrepreneur, EziPay Burrowes, Darren, Chief Technology Officer, Blue Zone Group Camilleri, Steven, Chief Technology Officer, Spee3D Campbell, Bob, Organisation Development Consultant, HR Consultant Cebon, Peter, Principal, Cebon Consulting Clarke, Professor Alice, Sustainable Minerals Institute, The University of Queensland

Conlan, Lindus, Research Focus Area Development manager, La Trobe University Coyne, Julian, CEO, Design Org Cram, Lawrence, DVC-R, Charles Darwin University Cram, Barbara, VET Pathways, Charles Darwin University Culbert, Geoff, President and CEO, GE* Cullen, Dr Kevin, CEO UNSW Innovations, The University of NSW Cundy, Darren, Director, Business Development and Technology Transfer, University of Tasmania Cunningham, Stuart, Director at ARC Centre of Excellence for Creative Industries and Innovation, Queensland University of Technology Dan, Jack, National General Manager, Telstra Daniel, Heiko, PVC, Research, University of New England Davies, Craig, CEO, Griffin Accelerator Dawe, Marcus, CEO, Carbon & Health Entrepreneur, Informatics Specialist, Health Horizons Dawson, Warwick, Director, Research Strategy and Partnerships, The University of NSW Day, Professor Karen, Dean, Faculty of Science, The University of Melbourne De Margheriti, John, Entrepreneur, Game Plus Coworking, Dreamgate Studios Deamer, James, Co-Founder, Garden Space Dennis, Ian, Executive Director and Chairman (Pro bono), Pearcey Centre for Innovative Industries **Economic Research** Desai, Bharat, Head of School, School of Service Industries, Charles Darwin University Dickerson, Wayne, Associate, JPW Architects Dods, Sarah, General Manager, eHealth Solutions, Telstra Health Domani, Ayala, Director Innovation, Telstra* Drummond, Callum, DVC Research and Innovation, RMIT University Dunne, Professor Tim, Executive Dean, Faculty Humanities and Social Science -, The University of Queensland Edwards, Meredith, Emeritus Professor, University of Canberra

Eedle, Liz, Universities Australia Farrelly, Colin, Partner/Owner, Indago Partners Finlay-Jones, Professor John, Deputy Vice-Chancellor (Research), Edith Cowan University Fitzpatrick, Rob, Chief Executive Officer, AIIA Fitzsimmons, Wayne, Chair, Pearcey Foundation Forest, Christy, Managing Director, Asia-Pacific, CEB* Fowler, Craig, Managing Director, National Centre for Vocational Education Research Frater, Michael, Rector, UNSW Canberra at ADFA, The University of NSW Gahan, Professor Peter, Director, Centre for Workplace Leadership, The University of Melbourne Gibley, Chris, CEO, Imagine Intelligent Materials Pty Ltd Gilmore, Rowan, CEO and Managing Director, EM Solutions Glover, Barney, Vice-Chancellor and President, Western Sydney University Goldstone, Trevor, Pro Vice-Chancellor, External Relations, University of New England Gooch, Daniel, Director, Strategic Projects Group, University of New England Green, Roy, Dean, Business School, UTS, UTS Gregory, Oscar, Director ARC Research Hub For Australian Steel Manufacturing, University of Wollongong Groth, Andrew, Senior Vice President I Regional Head, Australia & New Zealand, Infosys* Halloran, Lucille, Partner, Government & Public Sector Oceania Leader, EY Hamley, Ben, Partner, Strategy Designer, Business Models Inc. Hanson, Matt, Director, Hello Claims Harch, Professor Bronwyn, Executive Director, Institute for Future Environments, QUT Hargreaves, Professor Mark, Pro Vice-Chancellor (Research Collaboration and Partnerships), The University of Melbourne Harris, Andrew, Director, Laing O'Rourke, Engineering Excellence Group Harrison, David, Director, Government and Corporate Communications, The University of Western Australia Henderson, Angus, Innovation Partnerships & Programs Leader, Australian Council of Learned Academies

Henry, Professor Robert, Director, Queensland Alliance for Agriculture and Food Innovation, The University of Queensland Hermans, Ty, Managing Director, Evolve Group and Marco Engineering Heywood, Brigid, Deputy Vice-Chancellor (Research), University of Tasmania, University of Tasmania Hicks, Kim, Senior Manager, Policy and Advocacy, AIIA Hilder, Emily, Director, Future Industries Institute, UniSA Hindmarsh, Renee, CEO, ATN Universities Hiscock, Ms Rose, Director, Science Gallery, The University of Melbourne Hobbs, Julie, CEO, Chair, DIA, The Future Now Hoff, Brand, Company Director and Investor, Think Place Howard, Mat, Associate, 2017 Award for Architecture Innovation, JPW Architects Howlett, Dig, Cochlear* Hurps, Murray, CEO, Fishburners Hutchinson, Kelly, Program Manager, Dept. Economic Development, Jobs, Transport and Resources Hutchinson, Angus, CEO, Thomas Global Systems Hutchinson, Will, Chair, Thomas Global Systems Ireland, David, Entrepreneur, angel investor, and innovation consultant, ThinkPlace Jackson, Catriona, Deputy CEO, Universities Australia Jeng, Hoyoung, Head, SAP Innovation Center Brisbane Jensen, Professor Paul, Deputy Dean, Faculty of Business and Economics, The University of Melbourne Johnston, Professor Emma, Pro Vice-Chancellor Research, The University of NSW Jones, Professor Margaret, Director, Office of Research and Innovation, Edith Cowan University Kellock, Jo-Ann, Exec Director, Australian Design Alliance Kennedy, Sam, Director Public Sector Strategy & Innovation, Optus Business Kennedy, Narrelle, Innovation Advister, Kennedy Group Key, Peter, Policy Director, Australian Steel Institute Keys, Glen, Co-Chair at Aspen Medical and Owner, Aspen Medical

King, Conor, Executive Director, Innovative Research Universities Kooman, Kaaren, IBM Kovachevich, Anne, Associate, QLD ESD Leader and Australasian Foresight + Innovation Leader, Arup Lawrence, Roger, Founder and Director, Viceversa reality Layton, Peter, Director, EY Linton, Valerie, Professor, School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong Mak, Swee, Director, Strategic Innovation, RMIT University, RMIT University Marcus Clark, Phillip, Former Chair, EIF, JP Morgan Mareels, Professor Iven, Dean, Faculty of Engineering, The University of Melbourne Masters, David, Corporate Affairs Manager, Microsoft McArdle, Michael, Director, Office of Research, Queensland University of Technology McCluskey, Professor Jim, Deputy Vice-Chancellor (Research), The University of Melbourne McColl, Susan, General Manager, Division of Enterprise, The University of NSW McDougal, Rohan, Director, IP Commercialisation, **Curtin University** McEwan, Professor Alastair, Pro-Vice-Chancellor (Research) -, The University of Queensland McKay, Tim, CEO & Co-Founder at OKRDY McLennan, Tim, CEO, QUT Bluebox pty ltd McMenamin, Thomas, Co-Founder Pixelated Induction Pty. Ltd., Student at The ANU, Pixelated Induction McNaughton, Nick, CEO, ANU Connect Ventures McPhillamy, Louisa, Optus Melbourne, Michelle, Co-Founder, Installed Metcalf, Andrew, EY Federal Government Lead Partner, EY Miller, James, Technical Consultant, Informed Solutions Moghtaderi, Behdad, Head, Chemical Engineering, School of Engineering, University of Newcastle Moran, Professor Chris, Deputy Vice-Chancellor (Research), Curtin University Mortimer, David, Chairman, Crescent Capital Partners Ltd Moss, Dr Dean, Director, Uniquest Pty Ltd, The University of Queensland

Mullins, Trish, Director, Policy and Government Relations, The University of NSW Munive, Joseli, National Manager, Alliances and ICT Industry, GS1 Munro, Tanya, Deputy Vice Chancellor, Research and Innovation, UniSA Nelson, Peter, DVCR, Macquarie University Nicholls, Paul, Director of Strategic Projects, Curtin University Noonan, Liza, Executive Manager, Innovation and Director ON, CSIRO O'Brien, Michelle, Policy Adviser, Innovative **Research Universities** Owczarek, Professor Aleks, Deputy Dean, Faculty of Science, The University of Melbourne Owens, Professor Robyn, Deputy Vice-Chancellor (Research), The University of Western Australia Owens, Daniel, Executive Director, Research Services, The University of NSW Palmer, Lauren, Policy snd Projects Manager, Australian Council of Learned Academies Pankhurst, Ned, Senior Deputy Vice-Chancellor, Griffith University Pantano, Victor, University of Canberra Pearcey, Laurie, Pro-Vice Chancellor International, The University of NSW Pellegrino, Jason, Managing Director, Australia & New Zealand, Google* Penders, Monica, CEO, ACT Screen Industry Association Ltd Perkins, Carolyn, CEO, RUN universities Group Plint, Professor Neville, Director, Sustainable Minerals Institute -, The University of Queensland Plunkett, Sandy, Founder, Innovation Clearinghouse, Pty Ltd Poier, Luther, CFO, startup adviser, Blue Chilli* Reece, Mr Nick, Director Strategy, The University of Melbourne Reed, Tim, CEO, MYOB* Richards, Janine, Director, Research Analysis and Operations, Office of DVC - R, The University of Queensland Robertson, David, Design Ambassador, Design Institute of Aus. Robinson, Belinda, CEO, Universities Australia Roche, Suzanne, General Manager Policy and Government Relations, AIIA Rodda, Stephen, Director and Chief Executive, UniSA Ventures, University of South Australia

Rowan, Professor Alan, Director, Australian Institute for Bioengineering and Nanotechnology, The University of Queensland Russell, Jonathan, Engineers Australia Sah, Professor Pankaj, Director, Queensland Brain Institute, The University of Queensland Sahajwalla, Veena, ARC Laureate Director, Centre for Sustainable Materials Research and Technology, The University of NSW Saini, Deep, Vice-Chancellor, University of Canberra, University of Canberra Saunders, Elaine, CEO, CEO Blamey Saunders hears Schneider, Bennett, Co-founder, Pixelated Induction Shannon, Frances, DVC Research, University of Canberra Shannon, Rob, Associate Director, Business Development and Innovation, UWA Shepherd, Graham, Director, Telecommunications Association Smyth, David, Director, AC Solar Warehouse Snell, Andrew, Founder and Principal, The Coaster Group Pty Ltd Somerville, Dianna, Founder, Regional Pitchfest Sonenberg, Professor Liz, Pro Vice-Chancellor (Research Infrastructure & Systems), The University of Melbourne Sterling, Leon, Advisory Board, cuuble Stevens, Neville, Chair, NSW Innovation and **Productivity Council** Stirling, Petra, Head of Legal Capability and Transformation, Gilbert+Tobin* Stoianoff, Tanya, Head of Corporate Affairs, DXC Sullivan, Leigh, DVCRI, Federation University Templeon, Guy, President and CEO, WSP* Thodey, David, Chair, CSIRO Thompson, David, Acting CEO, RDA Northern Inland Tidhar, Gil, Entrepreneur, The University of Melbourne Tulloch, Sylvia, Entrepreneur, Angel Investor; Chair, Renewable Energy Innovation Fund Varcoe, David, CEO, Steel Insight Ward, Professor Robyn, Deputy Vice-Chancellor (Research), Acting Executive Dean, Faculty of Medicine, The University of Queensland Watt, Ian, Former Secretary, DPMC, Australian Government Wilson, Carolyn, CEO, Centre for Entrepreneurial Research and Innovation

Woods, Mike, Former Productivity Commissioner, R&D Inquiry, Government Wulff, Monica, Co-founder and CEO, Startup Muster Zannon, Steve, CEO, Proactive Ageing

Zulli, Paul, CEO, ARC Research Hub for Australian

Steel Manufacturing, University of Wollongong

3. Organisations invited to participate in Consultation Forums

List of organisations or bodies invited to be involved in stakeholder engagement roundtables

5 y's Pty Ltd 99 Consulting A.F. Gason Academy of Interactive Entertainment ACCI ACOLA Action learning **Acumen Ventures ADSA** Promotions Advance Cairns Advantage Wollongong (NSW Dept Industry) AE Projects Pty Ltd Agricultural consulting firm AIIA Albins Performance Transmissions Allotrac Amaero Engineering AME Systems ANU Connect Ventures (ANU/MTAA backed venture fund) Aquahydrex Aqualuma LED Lighting ARC Centre of Excellence for Creative Industries and Innovation Ardex Australia Pty Ltd Arthritis Relief Plus Limited Artibus Innovation, The Work Lab, Skillsbook ARTO ARUP Asialink Business Aspen Medical Astaricks (Yoomax Solutions) Astute energy Solutions **ATN Universities ATP** Innovations Augisoft

Aurecon AusBioTech Ltd AusBioTech Ltd Austeng Austmine Australian Business Chamber Australian Business Software Industry Association -ABSIA Australian Capital Ventures (Hindmarsh Group venture fund) Australian Centre for Robotic Vision Australian Honey Products Australian Industry Group (AIG) Australian Information Industry Association (AIIA) Australian Institute of Marine Science Australian Manufacturing Workers' Union Australian National Fabrication Facility Australian National University - Hotlight Systems Australian Private Equity & Venture Capital Assoc Ltd Australian School of Management (ASM) Australian Sports Tech Network, Manager ICT Australian Steel Mill Services Australian Trade and Investment Commission (AusTrade) Autech Software and Design AutoMed Axeze Pty Ltd **BAE** Systems Ballarat Innovation Industry Group **BASE Engineers Beacon Foundation BEC Feed Solutions Behaviour Innovation** Bell Bay Aluminium Bell Management Consultants P/L

Biodiem **BioMelbourne Network Bluechiip Limited** BlueScope Steel Wollongong Blundstone Australia Pty Ltd BMT WBM Machinery Group Boardcave.com Pty Ltd Bombora Wave Power Bond Business Commercialisation Centre, Bond University **Bond University** Bondi Labs Pty Ltd **Boomaroo Nurseries Bosch** Australia Brandsema Tomatoes Bridestowe Lavender Farm Bulk Nutrients Bioflex Nutrition, Tasmanian Health and Fitness Expo, and Southern Nutrition Bunbury Geographe Chamber of Commerce and Industry Bunbury Wellington Economic Alliance Inc Bureau of Meterology **Burleigh Brewing Company Business SA** Busselton Chamber of Commerce Inc. C.E. Bartlett Cairns and Hinterland Hospital and Health Service Cairns Chamber of Commerce Cairns Regional Counci **Campbell Scientific** Cape York Partnership, Dreamtime Funding Capital Angels (ACT Angel investor network) Carbon & Health Entrepreneur, Informatics Specialist, Mentor, Director Carbon Nexus **Carbon Revolution** Carina Biotech CCIO CDU Power & Water engineering sustainability CEA Technologies Pty Ltd Centre for Appropriate Technology Centre for Cancer Biology Centre for Crocodile Research Tas Rail

Ceramet Challenging Thinking & Business SA Board member Chamber of Commerce and Indusry WA Chamber of Commerce NT Charles Darwin University (CDU), Darwin Chris Hardy Pty Ltd **Cicada Innovations** Cisco City of Ballarat City of Gold Coast City of Greater Geelong City of Ipswich Economic City of Newcastle City Plan Strategy and Development Civmec **Clarity Pharmaceuticals Clinilink Systems** Clipchamp Pty Ltd **CMA** Engineers Co Founder/CMO Cogito Group CombiTile Pty Ltd **Commerce Ballarat** Committee for Ballarat Commonwealth Bank Companhia Brasileira de Metalurgia e Mineracao Cook Incorporated Coral Sunscreen Australia Core Resources Pty Ltd Council of Small Business Australia (COSBOA) CPDlive | Cahoot Learning | Professional Education CQ University Cradle Coast Authority Cradle Coast Innovation Inc. Cram Group CRC for Developing Northern Australia **CRC** for Remote Economic Participation Creative Universe, Creativity Australia & Creative Innovation Global Cromarty CSBP CSIRO CT4 Pty Ltd

Cullen Wines Cullin Innovation Pty Ltd Curtin University DAFWA - Department of Agriculture and Food Darwin Port Data 61 Deakin University Defence Materials Technology Centre University Of Wollongong Deloitte Deloitte (Darwin) Deloitte Access Economics

Depart of Education and Training (Queensland) Department of Agriculture, Fisheries and Forestry Department of Education and Training (Queensland) Department of Health Department of Industry Department of Science, Information Technology & Innovation Department of State Development Department of the Chief Minister, Northern **Territory Government** Dept of Primary Industry and Fisheries Dept. Agriculture and Food Design + Industry Pty Ltd Design Innovation Research Centre DesignMoves **DHIVE & Envision Digital Capability** Director of Office of Innovation UC DMTC DSG Dyesol **Dynamic Efficiency Eagle Crest Techologies** Early Risers - Gold Coasts Club for Women in **Business** ecka granules **EcoJet Engineering** EDC Consultants Pty Limited Eden Foods and West Haven Dairy Edith Cowan University

Effusiontech Pty Ltd Eidos Institute & MindHive Ellume Pty Ltd **EM Solutions** Geoff Lilliss Engineering Network Geelong Engineers Australia enVizion Group Envorinex Enware Epic Pharmacy Group **Ergon Energy** Eviva Pty Ltd Evolve Group and Macro Engineering Evolve Energy, AC Solar Warehouse, Energy Innovations Pty Ltd Evolve Group and Marco Engineering Executive Chairman Federation of Ethnic Communities' Councils of Australia Federation University **Finders University** Findex Group FireAnt Fishburners Five Faces Pty Ltd Five Y's Flinders University FMP Group Food Innovation Australia Food Innovation Partners Pty Ltd Food South Australia Forager Foods Forico Fusidium Pty Ltd **FutureNow** G2 Innovation G21 Agri Forum G21 Geelong Region Alliance Geelong Chamber of Commerce Geelong Manufacturing Council Gekko Systems GET Trakka Pty Ltd Glass Terra Pty Ltd

Gold Coast Central Chamber of Commerce Gold Coast City Council Gold Coast Health & Knowledge Precinct Gold Coast Innovation Centre Goldfields Esperance Development Commission Good View Fruits Co., Ltd., Landsen Innovation Pty Ltd, Natures Haven GrantReady Pty Ltd; President of Entrepreneurs Grattan Institute GRD Franmarine Holdings Pty Ltd Great Southern Development Commission Greater Sydney Commission Griffin Accelerator CBRIN Griffith University Hamilton Collins Pty Ltd Haymes Paint Hazelbrae Hazelnuts Health Reimagined HealthRFID Healthscope Hello Claims Pty Ltd Hunpty Doo Barramundi Hunter Medical Research Foundation Hunter Research Foundation Hunter TAFE Hunter valley coal chain coordinator Hunternet Huon Acquaculture Hydrowood iAccelerate **IBIS World** Iconics Energy Pty Ltd ICT Industrial Control Technology Illawarra Business Chamber Illawarra Innovative Industries Network Illawarra Retirement Trust **Imagine Intelligent Materials** Imaginot Pty Ltd Impact Innovation Group Indigenous Business Australia Indigital Pty Ltd Industry Capability Network (ICN) Victoria Information Security & IT Assurance, BRM Holdich Innov8ED Pty Ltd

Innovation NQ Innovative Asset Solutions Pty Ltd Innovative Manufacturing CRC Ltd Inpex Instaclustr Institute for Glycomics Intel Australia/New Zealand Intelledox InterfereX Communications Pty Ltd Intergrain Internetrix Inventium **IP** Australia IS-ON Ivvy Pty Ltd IXL J.L.V. Industries Pty Ltd James Cook University JESI Management Solutions Joy Mining Jurox Kiama Municipal Council **KILN** Incubator Kinetic Pressure Control Knowledge Commercialisation Australia **KPMG** Australia KPMG, Darwin Lake Macquarie City Council Launceston Chamber of Commerce and Industry Launceston City Council LGM Industries Lighthouse Sydney Linear Clinical Research Ltd Liquid Instruments Pty Ltd Luk Beautifood M Dingle Pty Ltd M&C Saatchi Macquarie Atlas Roads, Telstra Corporation, Stockland Group Magnattack Global Magnetica Limited Magnix Technologies Pty Ltd Maker & Co Collective Pty Ltd Marand Precision Engineering

Margaret River Chamber of Commerce Marist 180 Master Builders NT (formally Territory Construction Association), Darwin McCain Foods McKell Ibnstitute Me3D METS Ignited Australia Ltd Meyer Vandenberg Lawyers MHG Glass Michael William Crowe Consultancy Services Microsoft Minerals Council Australia NT Division Minifab Mitchell Institute MLA Monash University Mondelēz International Moneycatcha Pty Ltd Moshi Moshi Marketing Multicap Tasmania Murdoch University Museum of Old and New Art (MOANA) Myer MyHealthTest Pty Ltd NAB Ventures National Association for Commercial UAV / Drone **Operators** (ACUO) National Australia Bank, Darwin National Home Doctor Service/University of Queensland NCVER Newcastle Port Corp NIB Northern Australia Environmental Resources Hub Northern Midlands Business Association Northern Tasmanian Development Northern Territory Cattlemen's Association (NTCA), Darwin Northern Territory Government Northern Territory Seafood Council Nova Group Nova Systems Nowra Chemicals

NSW Department of Industry NSW Premier & Cabinet NT Farmers NTG Dept of Innovation Nuonic Nutrakol Pty Ltd NXT Global Pty Ltd Office of the Industry Advocate, South Australian Government One Ventures Innovation Funds Ontoto Pty Ltd Opmantek Ltd **Optika Solutions** Orange Squid Orrcon Steel Pacific Marine Batteries Payment Network International Pty Ltd PD Analytical Pty Ltd PDC Penguin Composites Perimeter Security Industries Pty Ltd Phoenix Australia Phoenix Power Recyclers Pty Ltd Pixalux Plant Health Australia POD Active Pollenzier Polygon Door Port Stephens Council Precision Agriculture Pty Ltd Primary Industries and Regions SA Private Forests Tasmania Pro Bono Australia Professionals Australia PwC **QMI** Solutions Ltd Queensland Department of State Development **Oueensland Incubator** Queensland Indigenous Family Violence Legal Service Queensland University of Technology **Quickstep Automotive** Quickstep Holdings Ltd QUT

QUT Creative Enterprise Australia qutbluebox Rankin Securities Pty Ltd **Raygen Resources** Raytheon RDA RDA - Far North Qld **RDA** - South West **RDA** - Goldfields Esperance **RDA** - Great Southern RDA - South West RDA - Tas RDA - ACT RDA -Perth **RDS** Partners Red Hat RedEve Regional Development Australia - Hunter Regional Development Australia - Moreton Bay Regional Development Australia, NT (Formally NTACC) Remsafe Pty Ltd Reposit Power Pty Ltd **Resilient Futures** Rio Tinto Iron Ore **Ripples pty Ltd River City Labs RMIT University Rockfield Technologies** Roesner Pty Ltd Rozenberg and Co Pty Ltd Runway Geelong Saab Australia (Mawson Lakes) Safety Culture SAP SAP Innovation Centre Savanna Solutions Pty Ltd Science and Industry Endowment Fund Science Industry Australia Science Technology Australia Scientell Sea Salt Marketing SeaSwift See Group

Seeing Machines Seeley International SEM Fire and Rescue Sendle Shellharbour City Council Sight for All Silanna Semiconductor Simoca Operations Pty Ltd Sitesee Skills Australia Slingshot Accelerator Small Business Smart Business Smart Cities Council Australia New Zealand SmartCap Technologies SME Gateway Snap Network Security Soto Engineers South 32 Worsley Alumina Pty Ltd South West Catchments Council South West Development Commission South West Science Council Spinify SRA SSS Manufacturing Pty Ltd Startup Aus Startup Catalyst + EIR @ River City Labs. StartUp Foundation STC Australia Steel Stewardship Council Ltd, Bluescope Steel Steele Business Solutions Pty Ltd Stramit Strongbuild Sue Spence Communications Sundrop Farms - Port Augusta and Adelaide City Swanport Harvest Swinburne University of Technology Sykes Racing Synergy TAFE Directors **TAFE** Illawarra TAFE Queensland North TAFE Queensland North Talison Lithium Pty Ltd Tap into Safety Pty Ltd
Tasmanian Chamber of Commerce and Industry Tasmanian Fruit & Vegetable Export Facilitation Group Tasmanian Institute of Agriculture, University of Tasmania, Strategic Alignment Associates Pty Ltd Tassal Group TasTAFE Taylor Rail Australia Pty Ltd TechinSA Technical Fabric Services Australia Pty Itd TEXTOR TECHNOLOGIES PTY LTD THE ARNHEM LAND PROGRESS ABORIGINAL CORPORATION The Australian Centre for Social Innovation The Boston Consulting Group (BCG) The Business Centre Newcastle Region The Clubhouse The Foundation for Young Australians The Friday Collaborative The Group of Eight The SPACE Australasia The University of Melbourne The University of Sydney The Yothu Yindi Foundation TheSpace ThinkPlace TomW Communications Pty Ltd Top Centre laundry **Towards Success Transformation Program** Townsville Business Development Centre Townsville City Council Trade and Investment Queensland Tribal Group Uni SA University of Adelaide University of Canberra

University of Newcastle University of Queensland University of Queensland Business School University of South Australia University of Tasmania University of the Sunshine Coast University of WA University of Wollongong **UNO Management Services** UNSW **UNSW** Innovations UoMC Ltd Upstart Challenge UQ Business School Urban Frontiers Pty Ltd USM Pty Ltd USO UTS V2i VECCI Venus Shell Systems Victoria University Visy Warrigal Western Dairy Hub Western Diary Incorporated Wingecarribee Shire Wollongong City Council Women in Agriculture and Business of SA Inc. Women in Stem & Entprenreneuship (WiSE), Griffith University World4Brains.com - Consult the World! Xero **Xtek Limited** Zaptz Pty Ltd

4. Consultation Overview Paper

Innovation and Science Australia (ISA) Australia's 2030 Innovation System Strategic Plan Consultations Program

<u>Innovation and Science Australia</u> (ISA) is developing a long term strategic plan to maximise Australia's innovation potential, positioning Australia to seize the next wave of economic prosperity and ensuring Australia's wellbeing and economic growth in the future. It will identify investment and infrastructure priorities and areas for consideration by government.

The Plan will build on the findings of the performance audit of Australia's innovation, science and research system and other reviews. It will describe what the System should look like in 2030 to ensure Australia reaches its innovation potential and make recommendations as to how Australia can get there. It will also outline how progress against the Plan can be evaluated.

The Board aims to release the Plan at the end of 2017.

Vision

The Board has adopted a vision for Australia's national Innovation, Science and Research System:

We want an Australia counted within the top tier of innovation nations, known and respected for its excellence in science research and commercialisation. Innovation, which can underpin a diversity of internationally competitive industries, will enable today's and future generations to have meaningful work, a great quality of life in a fair and inclusive society.

Approach

The Plan will build on reviews that have either been completed or are currently being undertaken as they relate to innovation, science and research in Australia and overseas. Key Australian reviews may include but are not limited to:

- Performance Review of the Australian Innovation, Science and Research System
- The Australian Government's <u>Science and Research Priorities</u>

- The 2016 National Research Infrastructure Roadmap
- International best practices in innovation, science and research.

The Board intends to engage widely with businesses, industry, research organisations, teaching institutions, government and non-government agencies, and the broader community to develop the Plan. This will involve face-to-face meetings, forums and workshops in Australian capital cities and regional centres, and social media. The Board has commissioned <u>Howard Partners</u>, a policy research firm, to assist in the consultations.

In undertaking the consultations, the Board is mindful of the extensive consultations processes that have been undertaken by the Commonwealth in the science, research and education areas in recent years and the submissions that have been prepared for major policy reviews and several Parliamentary Inquires - including the Inquiry into Australia's Innovation System and the Inquiry into innovation and creativity: workforce for the new economy. The Board will draw on this work and the submissions that have been made which are in the public domain.

Challenges that the Plan will address

The Board has identified six Strategic Challenges to achieve the Plan's vision:

- Moving more firms, in more sectors, closer to the innovation frontier
- Moving and keeping Government closer to the innovative frontier
- Delivering high-quality and relevant education and skills development for Australians throughout their lives
- Maximising the engagement of our world class research system with end users
- Maximising advantage from international knowledge, talent and capital
- High Impact, large scale initiatives to stimulate system innovation

5. Expert Opinion Survey

APPENDIX TO THE REPORT ON THE ANALYSIS OF STAKEHOLDER CONSULTATIONS: EXPERT OPINION SURVEY

Dr Mark Matthews, Dr John Howard, Caitriona Lacy

KEY MESSAGES FROM THE SURVEY OF EXPERT OPINION

The *Expert Opinion Survey* was undertaken following a comprehensive program of consultation through ISA sponsored forums, direct interviews, and attendance at events. A total of 361 responses were received.

The Survey asked respondents to indicate their level of agreement of disagreement with a number of propositions put forward in the Survey Instrument. The key messages from the Survey are summarised below.

- There is strong support for innovation being addressed through a national strategy across all sectors surveyed. However, responses to questions about the balance between using a strategy to build on existing and emerging *strengths* in innovation versus addressing existing and anticipated future *weaknesses* suggests a tendency to treat strategy as the affirmation of strengths rather than problem-fixing.
- Innovation is not viewed as primarily a concern for business. Business sector respondents expressed a range of views on this proposition (from strongly agreeing to strongly disagreeing). However, university and public research sector and government respondents tended to disagree with this proposition.
- Whilst opinion in the business sector tended to favour a 'laissez faire' stance for supporting innovation via de-regulation and market efficiency measures, opinion in government itself together with the university and public research sector is far less in favour of such a policy stance. Intermediaries tended to align with the business sector on this issue.
- Opinion across all sectors is strongly supportive of public policy seeking to enhance participation in Global Value Chains and also developing a better understanding of how trade agreements can impact on innovation performance.
- This support for enhanced international connectivity also extended to academic research, with respondents in all sectors (including business) being in favour of a national innovation strategy enhancing international research collaboration. This consensus across sectors also applied to the proposition that the effectiveness of the interactions between academic research and business-driven innovation is a legitimate focus for public policy.
- There was also consensus across sectors over the importance of balancing a recognition of
 place-based dimensions of innovation with international connectivity between these places.
 Similarly, there is consensus (including in the business sector) that academic research generates
 useful outcomes independent of innovation per se and that care should be taken to ensure
 that a national innovation strategy does not restrict useful non-innovation outcomes.
- Business and government respondents were supportive of the notion that the breadth of competitive considerations associated with successful national innovation performance means that industrial strategy is a more appropriate framework for supporting innovation.

What are the high-impact – large-scale initiatives that should feature in the national innovation strategy?

• Virtually all of the hypothetical large scale initiatives raised during the consultation process, apart from the development of a space industry, were supported in the survey as being of high

priority. Amongst the identified initiatives, support for **energy security** is strong across all sectors, especially within government, as is **water security**. There was broad support for personalised medicine. Establishing innovation as a priority in the **building and construction industry** is viewed as a high priority as is creating a world class competitive **digital connectivity system**. Similarly, leveraging **big data** as an innovation priority and driving innovation via **design excellence** is also a priority- though less so than big data. Innovation in **aged care** received variable levels of support. A very high priority was placed on establishing a **bipartisan commitment to innovation** over the long term. **Energy security** is viewed as a major priority across all sectors, but especially within government, as is **water security**.

What do experts think about innovation in business and industry?

- There is reasonable consensus that Australia does not have enough successful innovators. Opinion is ambivalent over the extent to which businesses are actively seeking to engage more effectively with universities over innovation and is also ambivalent over the proposition that there have been major improvements in university-business engagement over the last decade. The balance of opinion is that businesses do not have a sufficient understanding of the value of networks of trusted advisors in enhancing innovation effectiveness. Access to seed and early stage venture capital is not viewed as adequate, nor is access to follow-on and scale-up investments in innovation.
- Opinion was divided on the question of whether export-oriented companies have an adequate understanding of the impact of Global Value Chains (GVCs) and also on the issue of whether these companies have an adequate understanding of how to use innovation to target niches in GVCs. Opinion was also divided over whether export-oriented companies have an adequate understanding of how to handle cultural and language challenges in GVCs and also over whether these companies have an adequate understanding of how to build trust with GVC 'integrators'.
- There is strong consensus that Australia needs a stronger commitment to design and design thinking given the importance of this aspect of competitiveness.
- Australian businesses are viewed as too risk-averse in regard to innovation, and SMEs as too
 unwilling to commit to the training required to underpin innovation performance. There is
 consensus that businesses do not have an adequate understanding of how universities operate
 and that there is a failure to exploit the useful role of intermediaries in this context.

What do experts think about the role of universities and the public research sector in the national innovation effort?

- There is consensus that universities are actively seeking to engage more effectively with business over innovation but less agreement that there have been major improvements in this engagement over the last decade. Opinion is ambivalent over the extent to which it is becoming easier for senior people with business experience to move into universities. Respondents tended to agree that the major research facilities provided by universities are a useful innovation resource for industry but were more ambivalent over whether these useful facilities are accessible by industry.
- Opinion is divided over whether university technology transfer offices are becoming more
 professional and is ambivalent over whether TTOs (or their equivalents) are becoming more
 central to university missions. Similarly, there is ambivalence over whether Intellectual Property
 (IP) handling practices are becoming more effective. However, IP ownership practices that
 reduce academic staff mobility are viewed as a dis-incentive to devoting time to research
 commercialisation and IP management practices across the sector are also seen as inconsistent.
 This inconsistency over IP management is viewed as a challenge for universities engaging with
 universities over innovation.
- The balance of opinion is also that national innovation effectiveness would be improved if universities were willing to share more of the investment risks faced when innovating.

- The current commitment to internship and entrepreneurship programs is viewed as an important contribution to future innovation effectiveness. However, the balance of opinion is that university graduates are not equipped with sufficient knowledge of business fundamentals and nor do university research and teaching staff. There was strong agreement that research and teaching staff would benefit from more professional opportunities to gain business experience. Current tenure arrangements are viewed as restricting such professional opportunities. University policies relating to outside work are also seen as inhibiting collaboration with industry.
- Cross-subsidies from overseas student fees are viewed as a useful and appropriate contribution to domestic research funding. However, universities are not viewed as especially effective in leveraging their (often substantial) asset bases to resource research, teaching and collaboration capability.

What is the situation regarding translation and collaboration?

- Business incubators and accelerators are seen as making useful contributions to national innovation effectiveness, as are co-working spaces. Views are more ambivalent over whether the innovation-focussed collaboration centres set up by multinational corporations in Australia make a useful contribution to national innovation effectiveness. However, the current commitment to larger scale translational facilities is viewed as contributing to innovation effectiveness.
- There is ambivalence over whether or not there are now mature relationships between business
 and university leaders (the trust and reciprocity central to innovation effectiveness are features
 of mature relationships). Local place-based initiatives (innovation hubs and precincts etc.) are
 strongly supported in contributing to innovation effectiveness as is the broader focus on
 fostering innovation 'ecosystems'.
- The notion that Australia has a national aptitude for ingenuity received moderate support, with far greater support for the proposition that out aptitude for commercialising the fruits of this ingenuity does not match this level of ingenuity.

What do experts think of government's contribution?

- There is ambivalence over Australian Government Ministers' commitment to fostering innovation alongside a recognition that a ministerial commitment to fostering innovation is important to future prosperity and well-being. The balance of opinion favours the view that government commitment to free trade provides a useful stance for export-focused innovation.
- The Watt Review's recommendations to incentivise university engagement via the block grant system is supported, and the balance of opinion broadly favoured the proposition that a long-term commitment to immigration will contribute to improved innovation effectiveness.
- Opinion does not support the proposition that the changes made to Australian Government procurement have enhanced innovation effectiveness nor does it support the proposition that changes made to state/territory procurement procedures have had similar impacts on innovation.
- The experts agreed that the current commitment to STEM subjects is likely to contribute to improved innovation performance over the long-term as would the growing interest in program and policy experimentation within government. However, the ability to shut down failing policy experiments (crucial to effective experimentation) is viewed more sceptically.
- There is ambivalence over whether shortcomings in digital connectivity compromise innovation effectiveness and act as a break on business growth and competitiveness. In terms of physical connectivity, the balance of opinion slightly favours the propositions that weaknesses in public transport within cities and in their immediate regions (within 100km) limits innovation effectiveness.

- Balance of opinion supports the proposition that there is an insufficient commitment to design-related aspects of innovation in environmental, social and community contexts, and also supports the proposition that delays in approving grant applications within government are a constraint to innovation. Similarly, an inflexible approach within government to exploiting unanticipated opportunities in grant-funded projects is viewed as an innovation constraint as is an unwillingness to adopt a risk-taking investment approach to government support for research and innovation. A more joined-up approach to Austrade export market development grants and AusIndustry enterprise development grants is viewed as advantageous.
- Finally, opinion supports consolidating business support programmes across the Commonwealth but does not support devolving responsibility for business support to states and territories. Opinion supports creating education and training institutions that operate in both the higher education and vocational and education training sectors but is more ambivalent over (though still broadly supportive of) re-instating the Education Investment Fund (EIF) as a national tertiary education investment programme. Opinion is divided over whether local government statutory planning procedures limit the potential to stimulate innovation via supply chain 'pull-through'.

SCOPE OF THIS REPORT

This Report details the perceptions of people involved in the Consultations Program and others who have self-identified as *Experts in Innovation*, on the matters concerning improvement in the performance of Australia's National Innovation System. Over 400 people participated in consultation forums and interviews over the period March-June 2017.

The survey instrument that forms the basis of the report was developed on the basis of an analysis of feedback from consultations and interviews. It was designed around a series of *questions and propositions* that respondents could either agree or disagree with. A total of 361 people have responded to the survey.⁶ An opportunity was provided for respondents to provide additional comments, these are included in the Attachment.



Figure 1: Respondent involvement in development of the 2030 Strategic Plan (n=357)⁷

Most people had responded to the survey following participation in Forums or face to face meetings. However, a significant number responded on the basis of on-referral of the survey

⁶ Whilst an 'unable to comment' response option was included for each question the number of those responses has not been included in these results. The number of responses for each question is not including 'unable to comment'.

⁷ Respondents could have engaged with the development of the 2030 Strategic Plan in multiple ways before the survey.

instrument and specific invitation from Howard Partners. A profile of responses is provided in the chart below (Figure 1).

The survey is not intended to be representative of the general population. It is intended to reflect the views of people in business, the research sector, and in government who are involved in innovation, and the *innovation intermediaries* who connect innovators with other innovators, with other businesses, with government programs, and with the research and teaching sector. The scope of respondents is indicated in Figure 2.



Figure 2: Respondents by Sector (n=358)

Innovation intermediaries perform an important role in the innovation system. They include Enterprise Connect advisers, university technology transfer and business development staff, people in industry and professional organisations who have been assigned an engagement role, consultants in large professional services firms advising on business development and growth, and specialist advisers in small firms established specifically to build relationships between business, research and teaching organisations, and government enterprise development programs. Many intermediaries specialise in assisting firms secure government grants.

The responses to the survey questions and propositions are provided in the main body of this Report. Only limited commentary is provided. The more qualitative observations and conclusions from the consultations are included in the separate *Consultations Report*.

All responses to the survey propositions are included in charts. The charts do not include people who did not provide a response to a proposition.

7 Context and Top Line Questions

The first part of the Opinion Survey sought to gauge opinion on some 'top line' questions about innovation and innovation policy. These responses are especially useful as the broader context against which more detailed responses can be calibrated.

7.1 Is innovation primarily a concern for businesses?

During the face-to-face consultations, a range of comments were made about who had primary responsibility for driving innovation in Australia. There was a view, principally among business participants, that innovation is primarily a matter for business, whilst people in universities, research organisations, government and intermediaries had a broader view about roles and responsibilities. This is reflected in the following responses to the question 'Is innovation primarily a concern for business?'



Figure 3: Innovation is primarily a concern for businesses (n=329)

7.2 Should innovation be addressed through a national strategy?

There is a strong consensus amongst these experts that Australia's innovation challenges should be addressed via a national strategy – with almost all respondents agreeing to this proposition (either 'agree' or 'strongly agree'). This confirms the relevance of developing a national innovation strategy.



Figure 4: Innovation performance can benefit from an explicit national strategic policy framework (n=329)

7.3 What should be the extent Government involvement in innovation policy?

During consultations, there was a range of views concerning the extent of Government involvement in promoting innovation. Only 26 per cent of businesses disagreed or strongly disagreed with the proposition that "improvements in innovation performance are best achieved by governments focussing on effective deregulation and associated market efficiency measures". The comparable figure for universities was 52 per cent and for Government 22 per cent.



Figure 5: Improvements in innovation performance are best achieved by governments focussing on effective de-regulation and associated market efficiency measures (n=329)

7.4 How important is interconnectivity and participation in global value chains?

Another issue over which there is a strong consensus amongst experts is over the importance of fostering participation in Global Value Chains (the ways in which the world economy comprises value-adding chains that loop through individual national economies – often in complex ways). Almost all experts agreed that this should be a priority for public policy. This is a significant finding because interest in the relationships between innovation and Global Value Chains is relatively new – and, as such, points to aspects of national innovation strategy to focus on in the future.



Figure 6: Global business inter-connectivity means that a key aim of public policy, in general, should be to enhance participation in Global Value Chains (n=329)

7.5 Should we develop a better understanding of how Trade Agreements impact innovation performance?

Similarly, the broad thrust of responses to the proposition that Australia should develop a better understanding of how trade agreements impact on innovation performance supported such a focus. The insight sitting behind these responses is that the reality of Global Value Chains means that international inter-dependencies in innovation can, potentially, be affected by the details of trade agreements (e.g. IP provisions). Consequently, it will be useful to develop a better understanding of this issue in order to reduce possible risks to Australian innovation performance.

Figure 7: The importance of participation in Global Value Chains means that we need to develop a better understanding of how trade agreements can impact on innovation performance (n=329)



7.6 Should innovation strategy aim to enhance international research collaboration?

Experts also agreed that the importance of global academic research connectivity is such that a national innovation strategy should seek to enhance international research collaboration. This response reflects the wide-spread understanding that much cutting-edge research is based on international collaboration – single country-driven advances are now relatively rare.



Figure 8: Global academic research connectivity means that a key aim of a national innovation strategy should be to enhance international research collaboration (n=328)

7.7 Should innovation policy be concerned with interactions between academic research and business driven innovation?

Experts agreed that public policy should be concerned with the interactions between academic research and business driven innovation. This was used as a calibration question to identify dissenting views that might otherwise influence more specific questions relating to innovation strategy.



Figure 9: The effectiveness of the interactions between academic research and businessdriven innovation are a legitimate focus for public policy (n=329)

7.8 Should innovation policy address place-based dimensions?

Experts agreed that it is now important to balance a recognition that innovation has strong geographically-specific elements with a recognition of the importance of international connectivity in innovation (as addressed by the previous questions). This reflects the way in which there has been a strong emphasis on fostering place-based innovation capability (notably in the EU-backed 'Smart Specialisation' concept) over recent years – an emphasis that may have neglected the importance of international connectivity.





7.9 Should innovation policy recognise the value of basic or fundamental research?

There is widespread agreement with the proposition that Academic research generates useful outcomes independent of innovation *per se.* Unsurprisingly, strongest support came from the university research and the Government community. Business support totalled 59 per cent in agreement.



Figure 11: Academic research generates useful outcomes independent of innovation *per se* (n=329)

7.10 Should national innovation strategy recognise the value of non-innovation outcomes?

Experts expressed the view that a national innovation strategy should not restrict useful noninnovation outcomes. This reflects the insight that some very important outcomes from research can arise as 'public goods' – benefits that are widely valued and cannot be appropriated for private gain. There is always a risk that a forthright emphasis on innovation outcomes arising from research can 'squeeze out' consideration of public good outcomes. The opinion expressed here recognises this as a risk.

Figure 12: Care should be taken to ensure that a national innovation strategy does not restrict useful non-innovation outcomes (n=329)



7.11 Should innovation policy be a component of a national industrial strategy?

The purpose of this calibration question was to test whether expert opinion in Australia favoured the approach adopted by some other countries (e.g. the UK) – placing innovation strategy within a broader Industrial Strategy framework. The responses to this question indicate that business/industry representatives tended to agree with the proposition, as did government officials. However, university/public research sector and intermediaries were more ambivalent. This finding indicates that it may be worth exploring the advantages of placing innovation concerns within a broader industrial strategy stance.

Figure 13: The breadth of competitive considerations associated with successful national innovation performance means that Industrial Strategy is a more appropriate framework for supporting innovation (n=328)



7.12 Where should policy be focused in building innovation capability?

Experts were broadly in favour of framing Australia's national innovation strategy as a process of building on existing demonstrated and emerging strengths in innovation capability.



Figure 14: A key priority should be to build on existing demonstrated strengths in innovation capability (n=327)

There was also a dominant view that demonstrated current and anticipated future weaknesses should be a priority – but with a greater proportion of respondents being unsure of this forward-looking dimension (neither agreeing nor disagreeing). The indication of less certain opinion on current and anticipated future weaknesses is significant for strategy formulation because it

suggests a preference for focusing on strengths over weaknesses – *strategy as an affirmation rather than problem-fixing*.



Figure 15: A key priority should be to build emerging strengths in innovation capability (n=326)





Figure 17: A key priority should be to address anticipated future weaknesses in innovation capability (n=327)



8 OPINION ON HIGH IMPACT, LARGE SCALE INITIATIVES IDENTIFIED IN CONSULTATIONS

During the Consultations Program, many excellent areas were identified as potential high-impact, large scale initiatives in response to the ISA Board's invitation contained in the Overview Document and Issues paper. In particular, there were ten areas that attracted very strong interest in being candidate high impact, large scale initiatives. Specifically:

- Establish Energy Security as a priority to drive and execute innovation opportunities.
- Establish Water Security as a priority to drive and execute innovation opportunities.
- Establish Personalised Medicine as a priority to drive and execute innovation opportunities
- Establish innovation as a priority in the Building and Construction industry
- Develop a Space Industry as a priority to drive and execute innovation opportunities
- Create a world class and competitive Digital Connectivity system
- Leverage Big Data, technology platforms, and research infrastructure into projects that deliver national outcomes
- Establish design excellence and design thinking at the forefront of business innovation
- Address the problem of Ageing Population by capturing disruption in the age care and accommodation sector
- Establish a Bipartisan Narrative on innovation that is 'long term'



Figure 18: Priority allocated to the top 10 potential areas for high impact, large scale initiatives

The nature of these potential areas for candidate initiatives is outlined in the Consultations Report.

9 Business and Industry

9.1 Commitment to Innovation

Respondents were asked to respond to a deliberately provocative statement that "Australia has a sufficient number of highly successful innovators". The clear response (228 or 76 per cent) is that we do not, with respondents disagreeing or strongly disagreeing with the statement, although 42 respondents or 14 per cent were ambivalent and 31 or 10 per cent indicated that we do.





Responses to this proposition varied across industry sectors.



Figure 20: Australia has a sufficient number of highly successful innovators - response by sector (n=301)

9.2 Business Engagement with Universities and Research Organisations

Engagement between business, research organisations and government was a major focus on discussions during the consultations. There was a view that over the last several years businesses have been seeking to be more actively engaged. However, only 92 respondents or 31 per cent, agreed or strongly agreed with the proposition that "Businesses are actively seeking to engage more effectively with universities over innovation"



Figure 21: Businesses are actively seeking to engage more effectively with universities (n=293)

A relatively small number of respondents (97 or 34 per cent) agreed or strongly agreed with the proposition that "there have been major improvements over the last ten years in how effectively businesses engage with universities over innovation".





Clearly, there is more work to be done. The consultations identified a number of initiatives where universities research centres and intermediaries are seeking to lift the level of engagement. These are addressed in the Consultations Report.

9.3 Networks and Trusted Advisers

Consultations with businesses and intermediaries indicated that business does not understand or value business networks and networking, and the contribution of trusted advisers and mentors. Only 59 respondents or 21 per cent, agreed or strongly agreed with the proposition that "businesses have a sufficient understanding of the value of networks of trusted advisors to enhance innovation effectiveness".



Figure 23: Businesses have a sufficient understanding of the value of networks of trusted advisors to enhance innovation effectiveness (n=279)

9.4 Access to Capital

With the emergence of a large number of early stage investment funds, there is a view that there is sufficient venture capital for early stage investments. However, 222 respondents or 77 per cent, either disagreed or strongly disagreed with the proposition that "access to seed and early stage investment in innovation is adequate". Only 32 or 11 per cent agreed or strongly agreed.

This suggests that there may be a mismatch between the availability of capital and the number of investable propositions. There were many comments that angel investors tend to be risk averse, but there were reports of very successful relationships that had been formed between angel investors and new businesses. The venture capital model is not appropriate to all start-up and new businesses, and it may be appropriate to look closely at other funding sources.



Figure 24: Access to seed and early stage investment in innovation is adequate (n=287)

A total of 235 survey respondents or 82 per cent disagreed or strongly disagreed with the proposition that "access to follow-on and scale-up investment in innovation is adequate".



Figure 25: Access to follow-on and scale-up investment in innovation is adequate (n=285)

Consultations indicated that there was a shortage of equity funding in the \$0.75m-\$1.5m range.

9.5 Global engagement

Global engagement was a major talking point in consultations and is the subject of a paper prepared by Dr Mark Matthews and Caitriona Lacy as part of this Consultancy⁸. A view emerged that Australian export-oriented companies do not have an adequate understanding of how to participate in global value chains.

This is reflected in the 111 of the respondents or 44 per cent, to the survey who either disagreed or strongly disagreed with the proposition that "export-oriented companies have an adequate understanding of the impact of Global Value Chains on trade performance". However, 75 respondents or 29 per cent, agreed or strongly agreed with the proposition.

These responses may reflect a 'bias' in the expert opinions in that consultations tended to focus on successful exporting companies. The Case Studies, included in a separate Report, provide insights about how success is achieved.





The perceptions in relation to this proposition vary across sectors, as indicated below.

⁸ Matthews, Mark, & Lacy, Caitriona, 2017, Innovation strategy and global value chains, SGD Economic Development, Manchester





A total of 132 respondents or 52 per cent, disagreed or strongly disagreed with the proposition that "Export-oriented companies have an adequate understanding of how to use innovation to target niches in Global Value Chains".





Again, perceptions in relation to this proposition varied across sectors. Government particularly had limited confidence in the capacity of companies to target innovation niches.





A total of 134 respondents or 53 per cent, also disagreed or strongly disagreed with the proposition that "export-oriented companies have an adequate understanding of how to handle cultural and language challenges in Global Value Chain Participation". Only 46 respondents or 18 per cent, agreed or strongly agreed with the proposition.



Figure 30: Export-oriented companies have an adequate understanding of how to handle cultural and language challenges in Global Value Chain participation (n=255)

Perceptions also differed across sectors, with Government being less convinced about capability in this area.





Interestingly, 116 respondents or 48 per cent disagreed, or strongly disagreed with the proposition that "export-oriented companies have an adequate understanding of how to build trust with Global Value Chain 'integrators'".





Government also has less confidence in the ability of companies to build trust with value chain integrators.





A total of 202 respondents or 72 per cent agreed or strongly agreed with the proposition that "the commitment to design, and design thinking, is too weak given the global importance of this aspect of competitiveness". The absence of design as a component of innovation policy was identified as a major concern in consultations.





Commitment to design and design thinking was also canvassed extensively in interviews with experts in this area. Government appears to have the greatest concern about this weakness.





The low level of understanding of export-oriented companies about participation in global value chains, together with a weakness in design and design thinking is a major factor in limiting Australia's innovation performance.

9.6 Business appetite for risk

During the Consultations Program, frequent mention was made of Australian business aversion to risk. This is borne out in response to the proposition that "aversion to risk is considered to be limiting national innovation effectiveness". A total of 224 respondents or 76 per cent, agreed or strongly agreed with the proposition.



Figure 36: An aversion to risk in businesses is limiting national innovation effectiveness (n=294)

9.7 Commitment to training

The Consultations Program indicated that small to medium size business did not commit to training and staff development. A total of 192 respondents or 67 per cent, agreed or strongly agreed with the proposition that "small and medium-sized companies are unwilling to commit to the training required to underpin innovation performance".





This absence of commitment is a major issue to be addressed in improving innovation system performance. It impinges in a number of areas, such as acquiring new skills in a rapidly changing workplace and dealing with disruptive influences such as the impact of automation, robotics, and the Internet of Things (IoT).

9.8 Working and engaging with universities

In the following Section, mention will be made of the challenges that universities find in working with universities and research organisations. During the Consultations Program, it became increasingly clear that businesses do not have a good understanding of how universities operate.

A total of 248 respondents or 84 per cent, agreed or strongly agreed with the proposition that "businesses do not have an adequate understanding of how universities operate". The reasons for this are manifold, but there is often a failure to understand that universities are also in fact businesses, some with revenues in excess of \$2 billion, which means that they must be run on a business-like basis.

With the progressive decline in the proportion of government grant income in total revenues, it follows that universities will behave less like NGOs and charities, and more like corporations with highly developed strategies in the areas of teaching, research and engagement. In the research domain in particular, universities tend to commit to research where there is funding available.

The high level of commitment to medical research across the university sector is simply a reflection of the resources available for this area of investment.

The reluctance of industry to fund research in other areas of national priority is highly contingent on the resources available. There were many examples identified in the consultations where industry is working in partnership with universities, particularly in high technology areas. These arrangements come into effect when there is mutual understanding and a 'win-win' arrangement between university and business 'partners'.



Figure 38: Businesses do not have an adequate understanding of how universities operate (n=297)

There is a major challenge for SMEs to engage at a high level within universities. Intermediary organisations and professionals have emerged to facilitate this role. Intermediaries tend to work best when they have experience in both a university and business R&D environment.

A total of 230 respondents or 79 per cent, agreed or strongly agreed with the proposition that "the useful role of expert intermediaries in facilitating university-business engagement over innovation is under-exploited".



Figure 39: The useful role of expert intermediaries in facilitating university-business engagement over innovation is under-exploited (n=290)
10 Universities and the Public Research Sector

Universities are a national asset and have a critical role in a contemporary innovation system where the production of goods and services is increasingly knowledge based. They have important roles, as leading institutions in our economic, social and cultural framework. They are also independent, but for their own success, they must be effectively connected. Most universities recognise this critical role and have developed teaching, research and engagement strategies to address this. These strategies are becoming increasingly sophisticated.

10.1 Improvement in university engagement with business

This topic occupied a great deal of time in the consultations and was of immense interest to both the university and the business sector. During the Consultations Program, a view emerged that universities were getting better at engaging with business. The Opinion Survey indicated strong support for this proposition.



Figure 40: Universities are actively seeking to engage more effectively with business over innovation (n=302)

Whilst there is strong agreement that universities are seeking to actively engage, there is slightly less support for the proposition that engagement has been more effective.





During consultations, many people suggested that it should be easier for people with business experience to move to the university sector to contribute to research and teaching. Most people in the Opinion Survey disagreed with this proposition.



Figure 42: It is becoming easier for senior people with business experience to move into universities (n=270)

10.2 Business access to university research facilities

University and business participants suggested that there should be better access to expensive research facilities owned and operated by universities. There is strong agreement that the facilities can be a useful resource for industry innovation.





However, there are mixed views about the level of accessibility to facilities.





10.3 Technology transfer capability and performance

The consultations suggested that university technology transfer offices are becoming much more professional in the way they execute their roles and responsibilities. Whilst 97 respondents or 37 per cent agreed or strongly agreed with this proposition, almost 102 or 39 per cent were ambivalent in their response.





It is of interest that while a large proportion of respondents indicated that engagement with industry is improving, only 98 respondents or 38 per cent of respondents agreed or strongly agreed that technology transfer offices are becoming more central to university missions. However, the role and functions of technology transfer offices vary widely across the sector.



Figure 46: University Technology Transfer Offices (or equivalent units) are becoming more central to university missions (n=257)

The ambivalence about the centrality of technology transfer offices may also reflect concerns about Intellectual Property handling practices. This concern was raised consistently in consultation forums and interviews with business. More people disagreed rather than agreed that IP handling practices are becoming more effective. This should be regarded as a major concern regarding innovation system performance.



Figure 47: Intellectual Property (IP) handling practices are becoming more effective (n=268)

The approach to technology transfer and IP management varies widely across the university sector, with some universities going out of their way to make IP accessible, whilst others have a much more protectionist approach aimed at ensuring that public research investments are properly safeguarded.





Nonetheless, university technology transfer practices are also seen as a brake on innovation. There are also concerns that while academic staff are highly mobile between institutions, domestically and internationally, IP is not. That is, when research staff move to another institution, IP ownership does not necessarily move – unless, for example, universities have a policy of vesting ownership in the researcher.

With IP being immobile, owning institutions have little incentive to commercialise IP belonging to staff who are no longer with the institution. They have an interest, of course in securing returns from the IP where it contributes to further discoveries and inventions that are commercialised in other institutions that are linked to that IP. Complex negotiations may be necessary, together with delays, which in turn, may be of concern to an industry end user.

This concern may be exacerbated by inconsistent IP management practices across the sector. This is reflected in response to the proposition that IP "management practices are inconsistent across the sector".





Inconsistent University Intellectual management practices are considered by survey respondents to be a "challenge for businesses engaging with the higher education sector". A total of 200 respondents or 76 per cent, either agreed or strongly agreed with this proposition.



Figure 50: Inconsistent university Intellectual Property (IP) management practices are a challenge for businesses engaging with the higher education sector (n=263)

Part of challenge identified in consultations is that universities are not seen to be willing to share more of the investment risks encountered when innovating using university IP.





10.4 The appropriateness of the cross subsidy for research from international student fees

During consultations, the "cross-subsidy" from profits on international student fees being allocated to research was raised regularly. This is seen as an important source of revenue to fund research. A total of 172 respondents or 61 per cent, agreed or strongly agreed with the

proposition, "Revenue from overseas students is a useful and appropriate contribution to domestic research funding".

Revenue from international students is, of course, allocated to other investments, including student amenities and other capital expenditure items.





10.5 Developing the skills for innovation and an understanding of business

In consultations, participants were keen to discuss the contribution if internship and enterprise programs as enhancing the skills for innovation among students. In the survey, there was very strong agreement with the proposition that "the current commitment to internship and/or entrepreneurship programs is an important contribution to future innovation effectiveness".



Figure 53: Effectiveness of internship and entrepreneurship programs (n=292)

There was a concern, however, that graduating students lacked an understanding of business and business fundamentals. A total of 191 respondents or 65 per cent, disagreed or strongly disagreed with the proposition that "University graduates are currently equipped with sufficient knowledge of business fundamentals".



Figure 54: University graduates are currently equipped with sufficient knowledge of business fundamentals (n=294)

This concern is linked to a perception that university research and teaching staff do not have a good understanding of business fundamentals. This perception also has implications for the capacity to build strong university business relationships.





There is a complementary finding in another part of the survey, that people in business do not have a good understanding of how a university works. However, in this context of this part of the Report, a total of 275 respondents or 91 per cent, agreed or strongly agreed with the proposition that "university research and teaching staff would benefit from more professional opportunities to gain business experience".



Figure 56: University research and teaching staff would benefit from more professional opportunities to gain business experience (n=301)

Options identified in consultations included interchange and 'sabbatical' arrangements with business partners and further commitment to industrial PhDs.

There were many barriers identified in consultations about how university staff could acquire business experience through collaboration.

10.6 Barriers to gaining business experience and collaboration

During consultations, the matter of barriers to gaining business experience and closer collaboration was discussed. An important constraint is seen to be long term tenure arrangements and first-order commitments to teaching and research underperformance agreements restrict opportunities for gaining business experience.

Figure 57: Current tenure arrangements restrict professional opportunities to gain business experience for university research and teaching staff (n=257)



Survey respondents also considered that university policies to academics engaging in outside work may inhibit research collaboration with industry. University policies in this area vary, with some insisting that all outside external engagement be channelled through a research office, with contributions to university overheads', whilst others are far more flexible, and supportive of staff engaging in outside activities – particularly in their own time and does not require access to university assets.



Figure 58: Academics' research collaboration with industry is inhibited by university policies relating to outside work (n=263)

10.7 Effectiveness of universities leveraging their asset bases to invest in innovation

Universities make money in their teaching activities. University Councils exercise strategic choices concerning where to place that investment - research facilities, equipment, maintenance, and student amenities. Choices are influenced by access to funding/investment pools, co-investment with business, access to philanthropy, and ability to leverage property assets, and one-off grants. The EIF was an effective program in this regard, but it has not been evaluated



Figure 59: Universities are currently effective in leveraging their asset bases to invest in research, teaching and collaboration capability (n=283)

Most universities have very strong balance sheets and potentially have funds available for investment in facilities to support innovation. Many have active strategies to invest in research and teaching facilities. However, the proposition that universities are effective in this area is not strongly supported.

11 Translation and Collaboration

11.1 Incubators, accelerations, and co-working spaces

In this part of the survey, respondents were asked for opinions on the performance of a range of activities and initiatives that are intended to support connections and collaboration between research organisations, business, and government.

Respondents generally agreed or strongly agreed with the proposition that "business incubators/ accelerators make a useful contribution to national innovation effectiveness".



Figure 60: Business incubators/accelerators make a useful contribution to national innovation effectiveness (n=295)

Respondents were also generally agreed or strongly agreed with the proposition that business co-working spaces make a useful contribution to national innovation effectiveness.





Co-working spaces are provided by a number of organisations including universities, innovation networks, and business incubators. Increasingly, large corporations are providing co-working spaces to stimulate innovation.



Figure 62: The innovation-focussed collaboration centres set up my Multinational Corporations in Australia make a useful contribution to national innovation effectiveness (n=257)

11.2 Building scale in translational research

During consultations, attention was drawn to a number of collaborative initiatives in collaborative research translation. A total of 161 respondents or 60 per cent, indicated agreement or strong agreement with the proposition that commitment to larger scales in translational research will contribute to innovation effectiveness.



Figure 63: The current commitment to larger scales in translational research will contribute to innovation effectiveness (n=267)

11.3 Developing personal connections and relationships

Collaboration requires the development and sustaining of personal connections and relationships between leaders in research organisations, business and government. It was pointed out on several occasions that "people do business with people they trust". Discussions and interviews indicated that collaborative relationships are becoming more mature, although challenges remain. This is indicated in response to the proposition that "there are now mature collaborative relationships between business and university leaders".



Figure 64: There are now mature collaborative relationships between business and university leaders (n=279)

11.4 Innovation hubs, precincts and districts

The survey indicates strong agreement for the proposition that "local place-based initiatives (e.g. innovation hubs, precincts and districts) make useful contributions to national innovation effectiveness".

Figure 65: Local place-based initiatives (e.g. innovation hubs, precincts and districts) make useful contributions to national innovation effectiveness (n=296)



Respondents also indicated strong support for fostering innovation ecosystems. A total of 266 respondents or 90 per cent, agreed or strongly agreed with the proposition that "A focus on fostering 'innovation ecosystems' (complementary assets, skills and relationships) makes useful contributions to national innovation effectiveness.



Figure 66: A focus on fostering 'innovation ecosystems' (complementary assets, skills and relationships) makes useful contributions to national innovation effectiveness (n=294)

11.5 Australians' aptitude for ingenuity

During consultations, there a great deal of discussion about how to develop an innovation culture. Australia's aptitude for ingenuity and mastering 'the tyranny of distance' was also discussed. Only just above of half (53 per cent) of respondents agreed or strongly agreed that "Nationally, we have an unusually strong aptitude for ingenuity".





There was, however, strong agreement to the proposition "Our aptitude for ingenuity is not matched by our aptitude for commercialising the fruits of this ingenuity" with 230 respondents or 77 per cent, indicating agreement or strong agreement.





12 Government and Public Policy

12.1 Ministerial and Government commitment

During the Consultations, there was a concern expressed about ministerial commitment to fostering innovation. This is borne out in the survey, where a total of 139 survey respondents or 49 per cent, disagreed or strongly disagreed with the proposition that "Australian Government Ministers are committed to fostering innovation". A total of 76 respondents or 27 per cent, agreed or strongly agreed with the proposition.





Figure 70: A government ministerial commitment to fostering innovation is important to Australia's future prosperity and social well-being (n=297)



At the same time, 274 respondents or 92 per cent, agreed or strongly agreed with the proposition that "Australian Government Ministers are committed to fostering innovation".

12.2 The Intersection between Innovation and trade policy

There is a high level of agreement to the proposition that "the Australian Government's commitment to free trade provides a useful policy stance for export-focused innovation".



Figure 71: The Australian Government's commitment to free trade provides a useful policy stance for export-focused innovation (n=280)

12.3 Impact of the Watt Review

There is a high level of agreement for the proposition that "the Watt Review's recommendations to incentivise university-academic engagement via the block grant system will be a useful contribution to national innovation effectiveness".





12.4 The Intersection between Innovation and other Policy Domains

12.4.1 Immigration Policy

Respondents generally agree or strongly agree with the proposition that "a long-term government commitment to immigration will contribute to improved innovation performance in the future".



Figure 73: A long-term government commitment to immigration will contribute to improved innovation performance in the future (n=283)

The contribution manifests in a number of ways, including attraction of skilled professionals and people keen to start a business. The termination of the Section 457 visa arrangements received a great deal of attention in the Consultations.

12.4.2 Growth Centre policy

Participants in the Consultations and 118 respondents or 46 per cent, to the survey agreed or strongly agreed with the proposition that "the Industry Growth Centre initiative is a useful contribution to national innovation effectiveness".

Figure 74: The Industry Growth Centre initiative is a useful contribution to national innovation effectiveness (n=255)



In consultations, participants saw the potential to expand the growth centre remit into a broader industry development role.

12.4.3 Procurement policy

Procurement policy and practice were the subject of a great deal of attention in the Consultations. The responses to the survey do not send a strong message that changes that have been made to Australian Government procurement procedures enhance innovation effectiveness.





There is a similar perception regarding State/Territory changes.





12.5 Commitment to STEM education

In consultations and in the survey, there is solid support for the proposition that "the current commitment to Science, Technology, Engineering and Mathematics (STEM) subjects in schools is likely to contribute to improved innovation performance over the long-term".

Figure 77: The current commitment to Science, Technology, Engineering and Mathematics (STEM) subjects in schools is likely to contribute to improved innovation performance over the long-term (n=291)



Many examples were given in the Consultations sessions of initiatives being implemented at the local level through individual and community initiative. Funding is sourced from a wide variety of channels.

12.6 Improving innovation effectiveness through policy and program experimentation

During consultations, there were suggestions that the discontinuity and frequent change in policies and programs could be addressed by a greater commitment to experimentation – testing to see whether a larger scale initiative would achieve outcomes.

There is firm support for the proposition that "the growing interest in program and policy experimentation within government is a useful contribution to national innovation effectiveness".



Figure 78: The growing interest in program and policy experimentation within government is a useful contribution to national innovation effectiveness (n=273)

There is a concern, however, that once experiments have got underway, constituency support may find it hard to close down an experiment if it is not working. This is indicated by the level of agreement and strong agreement to the proposition that "The ability to shut down failing public sector experiments is adequate".





12.7 Infrastructure to support innovation

12.7.1 Broadband connectivity

Concerns were expressed during Consultations about shortcomings of broadband connectivity and the adverse impact on business. A total of 141 respondents or 54 per cent, agreed or strongly agreed with the proposition that "Shortcomings in national digital connectivity has compromised national innovation effectiveness by being a brake on general business growth and competitiveness".





Concerns were also expressed about 'black-spots' in wireless connectivity, particularly on major road and rail corridors.

12.7.2 Public transport

People consulted expressed serious concern about public transport connectivity within Australia's major cities and the impact on innovation. It reflects a concern about the capacity to build social capital. Social capital is defined by the OECD as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups".

As cities grow and expand, public transport becomes more important in building and sustaining social capital. Notwithstanding the ubiquity of digital networks and connectivity, social capital is regarded as critical for innovation effectiveness. A total of 150 survey respondents or 56 per cent, agreed or strongly agreed with the proposition that "weaknesses in public transport connectivity within cities limits innovation performance".





During consultations, participants expressed concern about access to CBD locations from the 100km perimeter of the major cities. Improvements in connectivity were considered to lift innovation performance by enabling greater access to city locations. Weaknesses in public transport connectivity within cities limits innovation performance.

Weaknesses in public transport connectivity between cities and their immediate regions (up to 100km radius) is also considered to constrain innovation performance.





12.8 Commitment to design based innovation

During the Consultations program, a great deal of attention was given to Australia's apparent weakness in design innovation and design policy. In fact, unlike our competitor nations, Australia does not have a design policy.

The potential of design innovation, and commitment to design practice, and the competitive advantage that flows, was raised in several Forums and a number of interviews. There are several possible reasons for this, including a perception that designers do not see themselves as innovators: *design is the innovation*. Design innovation is often embedded in new products, new services, and in a much broader context, the way service organisations, public and private, interact with their customers and clients.

Design thinking, which involves *innovating around the customer or end user*, is gaining greater acceptance in both business and government, particularly in the service sectors – which constitute 80 per cent of the Australian economy. It is a departure from traditional ways of innovating which starts from a "science and technology" push perspective. Design-based approaches inevitably pull through advances in science and technology – sometimes developed many years previously.

The proposition that "there is an insufficient commitment by government to support designrelated aspects of innovation in environmental, social and community contexts" was supported by 176 of the 258 people who responded (68 per cent).





12.9 The Impact and performance of Enterprise Development programs

During consultations business, people generally responded that they did not become involved in enterprise development programs. There is also a concern that it takes far too long to obtain access to a grant through the approval processes and this limits opportunities for innovation.

A total of 185 respondents agreed or strongly agreed with the proposition that "delays in approving grant applications within government are a constraint to national innovation performance".





There is also a concern, expressed in consultations and reflected in the Opinion Survey that "an inflexible approach within government to exploiting unanticipated opportunities in grant-funded projects is a constraint to national innovation performance". This concern related to the perceived inflexibility in categorical and criteria based programs. There was a view that many good ideas do not get funded because they cannot be made to 'fit' program design criteria.

This problem will continue as grant programs are designed around meeting criteria rather than being an 'investable' business proposition made on a sound business case.



Figure 85: An inflexible approach within government to exploiting unanticipated opportunities in grantfunded projects is a constraint to national innovation performance (n=267)

In the Australian federal context, export market development grants (administered by Austrade) are not linked to the enterprise development grant programs administered by AusIndustry. A total of 112 respondents or 54 per cent, agreed or strongly agreed with the proposition that "The de-coupling of export market development support from industry development and innovation support constrains the return-on-investment from these government interventions".



Figure 86: The de-coupling of export market development support from industry development and innovation support constrains the return-on-investment from these government interventions (n=209)

Building connections between funding sources can be addressed by competent intermediaries.

During consultations, a view emerged that Grants Administration procedures are not considered to take risks in supporting research and innovation initiatives. A total of 211 respondents or 78 per cent, agreed or strongly agreed with the proposition that "an unwillingness to adopt a risk-

taking investment approach to support for research and innovation constraints the return-oninvestment from these government interventions."





During consultations and in the Survey, there is strong support for the consolidation of business support programs. A total of 216 respondents or 77 per cent, agreed or strongly agreed with the proposition that "business support programmes should be consolidated across the Commonwealth (removing duplication and inconsistencies)".



Figure 88: Business support programmes should be consolidated across the Commonwealth (removing duplication and inconsistencies), (n=281)

However, respondents did not have much appetite for the idea that responsibility should be devolved to State/Territory Governments. Only 89 respondents or 32 per cent, agreed or strongly

agreed with the proposition that "responsibility for business support should be devolved to states/ territories, with the Commonwealth government concentrating on national issues".





12.10 Development of institutions that integrate occupational and academic learning

During consultations, there was a great deal of discussion about the connections between occupational learning (VET) and academic/knowledge based learning (universities). Reference was often made to tertiary education systems in other countries where the connection is strong.



Figure 90: The Commonwealth Government should facilitate the creation of education and training institutions that operate in both the higher education and Vocational and Educational Training (VET) sector (n=276)

A total of 171 respondents or 62 per cent, agreed or strongly agreed that "the Commonwealth Government should facilitate the creation of education and training institutions that operate in both the higher education and Vocational and Educational Training (VET) sector".

12.11 Reinstatement of the Education Investment Fund

During consultations, there was a great deal of discussion about the achievements if the Education Investment Fund, in terms of collaborative investment in much-needed teaching, research and campus development facilities in Australian universities.

A total of 124 survey respondents or 57 per cent, agreed or strongly agreed that "the Education Investment Fund (EIF) should be reinstated as a national tertiary education and research infrastructure investment programme".





12.12 Local Government impact on innovation effectiveness

During consultations, concerns were expressed about the way that local government statutory planning procedures (building, development, environmental, and other land use controls) could constrain innovation by limiting the ability of businesses to operate efficiently.

A total of 115 respondents or 53 per cent, indicated agreement or strong agreement to the proposition that "Local government statutory planning procedures limit the potential to stimulate innovation via supply chain 'pull-through'".





Attachment: Additional comments provided by Survey Respondents

Comment from respondent

The humanities and social sciences are also important for an innovative nation - many of these statements cannot be ranked effectively using the agree/disagree criteria listed. They also need a qualifying statement.

1. It concerns me that the ecosystem for innovation in Australia is tilted in favour of large organisations - whether they are government or private sector. The ecosystem is top-down, which stifles innovation. The current paradigms are pretty much back to front. Academics are only part of the solution. Industry is only part of the solution. If you want a sustainable innovation ecosystem, start with communities and passionate people. 2. There seems to be no obvious overarching purpose, except innovation itself. To me the two biggest foreseeable impacts on the country are Job Automation and Climate Change, yet we are spending millions/billions on ideas that will simply extend the problems associated with both of these issues.

We need to focus ALL of our efforts on dealing with these megatrends issues and THEN apply related solutions and/or opportunities across our entire economy. Simply put, unless we are in the business of surviving Job Automation and Climate Change, we won't. 3. We do not have the resources to address everything so innovation should be focussed on leverage points, e.g.

<u>http://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/</u> Unfortunately I do not have the time at the moment to provide a more complete response - there are so many things that need to be addressed. I sincerely hope that the 2030 plan ends up being a passion-filled purposeful strategy document that becomes so well-thumbed dust never has a chance to accumulate upon it.

A lot of the questions were focused on universities. We need to understand that innovation and emerging technologies is not strongly positively correlated with universities. There is a large amount of innovation happening in private industry. Universities have budgets, relationships and long standing culture with government which makes it seem like innovation couldn't happen without universities, but it can.

A national approach to innovation and industry development with tied grants to the State's is preferable to complete devolution to the States. Election cycles are to be avoided. Institutionalisation of programs for long term growth are highly desirable. Creation of new higher education institutions focussed on innovation is less desirable than making existing and funded institutions more responsive with incentives.

A national innovation strategy should harness the talent and ingenuity of citizens to create benefits for all. Social innovation can rebalance inequality and ensure greater prosperity for Australia's future. A narrow focus on commercialisation misses the opportunity to address other challenges.

A strong and dynamic VET sector is critical to our future. The ability to adapt is key and the VET sector can pivot. It has to pivot. And therefore has to take risks and invest ahead of the market. It needs the government's absolute support to do so. Otherwise we will all still be learning skills for yesterday. There must be a clear line between HE and VET without a blurry competitive cross-over. This is a waste of energy and time.

Academic performance assessments need to go beyond publication to recognise contribution to industry impact

Comment from respondent

Any innovation strategy must have bi-partisan support.

At a recent conference, a delegate from DARPA (USA), defined "innovation" within his presentation. He defined it as "making something new and useful". These are plain English words, and they meet all the criteria needed to sell the concept of innovation to the general person. It can encompass everything from intangibles to concrete things. I recommend this to you to use.

Australia would benefit from clarifying the specific roles of players in the innovation system, supporting them long-term with regular review and improvement.

Australia, rather appallingly is seen now as the least progressive or enlightened country in the world when it comes to STEM education and training programs; our governments collectively having failed to articulate and demonstrate to date that either the Innovation and STEM education agendas or the business and research models of our research institutes and universities are in any way inclusive ones.

Promotion of the STEM agenda in Australia particularly, is instead focused almost exclusively around Secondary School and University education when in fact over 30 per cent per cent of STEM education is delivered in vocational training for Trade Apprentices ,Technicians and Graduate Cadet ships, Apart from Swinburne, RMIT and a couple of other enlightened university educators there is no interest whatsoever by Australian Universities towards an 'articulated' STEM educational model... and contrary to the integrated skills models that are implicit and resonate with a 'parity of esteem' inclusively across the UK Innovation Catapults and University Technical Colleges neither our Innovative Manufacturing CRC nor the Advanced Manufacturing Growth Centre see any apparent need or interest to integrate high level vocational training, up skilling and cross skilling higher educational pathways into their service offerings.

Unfortunately this almost ideological divide is also illustrated by the Apprenticeship "reform" agendas that have also become an oft-repeated component of Australian workforce political dialogue in recent years, with influential big end of town employer groups lobbying politicians to find new, less-regulatory (meaning employer specific generic meaningless non-transferable qualification) routes to supposedly lower costs, improve productivity and address perceived skill shortages ...

A more forward looking Apprenticeship 'reform agenda' should however in retrospect, have been an opportunity for a serious scoping study regarding the specific skills, delivery structure and training needs of a scaled-up sovereign defence, aerospace and the engineering infrastructure industry capability Done properly, this would have looked at the inclusive skills base development process, transferable and up-skilling opportunities represented currently, with a relevant qualification and skills assessment process comparable to, say, the UK Defence and Aerospace industries, and validated by exemplar international defence primes like BAE operating in Australia.

This would aim to provide a flexible pool of high skills with the baseline training to be quickly up and cross skilled to provide the changing needs and drivers of not only defence, shipbuilding and aerospace but our mining, rail, new energy and auto industries. Jon Bradshaw

Australia's IP arrangements currently do not support a lengthy or evolving commercialisation process.
Australian innovation policies are too focussed on commercialising academic research While this is useful, it is more important to boost the responsiveness of research to business questions/needs. For example, business people can't just ring a uni and ask to talk to someone. Put business first and let them pull innovation from the public sector, while maintaining basic research capabilities. The German model of industry driven research centres is ideal. Networking of SMEs is a neglected area with CSIRO, the industry growth centres etc focussing on a very small number of larger businesses.

Overall - research is irrelevant to the vast majority of businesses. The ministerial focus given collaboration with industry in defence recently is working and a model of government leadership. The F-35 development bringing in 30 plus companies at an early level should be the procurement model. Industry participation programs come into effect too late when projects have already been engineered and designed usually overseas and with overseas suppliers in mind. This leaves Australians with the crumbs. Fostering local engineering and design, as happened in the early days of LNG developments but which was neglected later, is the way to get useful involvement by industry at an early stage.

Beware of over emphasis on big business and big universities to drive innovation, as they are slow to make decisions, action initiatives and react to market changes and opportunities. SME's are more likely to innovate as a necessity as well as the none existence on hierarchical speed bumps and barriers.

Bi Partisan support for programs in the national interest is a must. Innovation and research programs that support business require long term investment, consistency and commitment to achieve the desired aims. Forcing collaboration through programs is not useful. The most effective way to encourage collaboration between business and the university sector would be provide universities with the tools and frameworks to be able to collaborate in the timeframes that business work to.

Cluster development programs should be reinstated as a matter of priority.

Collaboration is enhanced by having an effective national industry cluster program with a complimentary training program for cluster facilitators

Constant changes in innovation policy over the last 20 years have not helped. Populist and ideological attitudes on innovation have got in the way - Senator Carr's statement "we don't pick winners" and "we don't give money to rich people" did not help at the time and still persist. Industry Policy and operational programs are populated with people that feel they are doing the right thing but can be described as "anti-business" and "anti-commercial". It's a cultural issue that will most likely remain and operate in the background.

Funding / grants over the last 10 years have been a battle between the academic sector seeking as much as they could get which has limited funding for early stage/seed/growth. It seems that governments have reduced funding over time in commercialisation programs. There is a lack of understanding of the needs of early stage and a lack of confidence in funding these programs by govts as a result. Has anything changed? And what were they thinking when they set up the incubator programs?

Not a lot of confidence that policy people know what they are doing. I have spent 30 years taking Australian companies off shore. I am yet to see an impact of trade policies making it easier in the export development of Australian SMEs. John, interested to get a copy of the report.

Facilitate smart specialisations nationally underpinned by strong regional clusters to increase innovation and economic competitiveness.

Facilitating collaboration between companies and universities in such a way that both parties perceive a winwin situation is essential...this typically comes down to people connections, and relationship building. For Australia this is harder work than for most countries because of the tyranny of distance. A national approach where we pick a few sectors where we present team Australia to the world is called for. Defence, energy, water, primary industries seem logical in this space.

Felt that was a lack of clarity in definition of terms and that innovation as used overlapped/confused with invention.

From my perspective, universities have too often paid lip-service to engagement with the private sector and do so only if there is a financial incentive. More effective collaboration may only be facilitated if a significant proportion of federal funding is tied to real engagement with business, making it a core activity with demonstrable KPI's, rather than optional.

From the overall number of questions, it appears that there is a real need to isolate the key things that need to be achieved with innovation. Policy and strategy. The focus should be in making easier for the institutions and industry to take this forward rather than to get involved with every issue. The need for universities and industry to do more together should be strongly encouraged and real solutions found for the commercialisation of ideas.

Giving businesses the ability to respond to Government tenders and grants with innovative solutions, rather than meeting a specific RFT criteria, would allow industry to provide a better way of doing things.

Government needs to operate as a Portfolio Manager, more than a Program Manager. We need to operate our programs on a State-unified basis. We need to data-profile the effectiveness or otherwise of the innovation pathways (eg not just the occasional and typical Government program 'dorothy-dixer' review) to capture a longitudinal profile of the system.

Govt Policy re fostering innovation should focus on: - Competition Policy; - labour/capital workplace reform - national moonshot goals/urban and regional renewal - educating ministers and APS re fundamental global innovation shifts Business/Industry should focus on: - globally aware/relevant business opportunity and competitiveness - education of C-suites and Board level re digital networks and platform strategies (as opposed to traditional "people" networks - Role and "value" Multi-national ICT companies (predominately branch office sales and marketing) should be critically assessed

Greater recognition of sustainable agricultural practices and technologies as being fundamental to long-term global prosperity

Having worked on national and international innovation for the past 7 year, there is insufficient attention paid in Australia to the creation of an ecosystem that provides the conditions for innovation without directing to national priorities. The uniform factors international that foster innovation are a stable funding base that has bipartisan government support for extended (read greater than 15 years) periods (eg Germany, US, Switzerland), funding that supports both industry AND researchers to talk to each other as well as funding blue sky research (US, UK, Germany, Scandanavia and Switzerland), facilitator driven systems (eg Scandanavian sector) and fostering of innovation without identified priorities to capitalise on blue sky research (all of the above). The inexplicable focus on Israel, a country that has the highest per capita investment in research, an appalling track record in research and a high dependence on IP theft, is inexplicable.

Hubs are not incubators, here is an urgent need for Real Incubators, not people occasionally talking to each other in a communal shed. We need a wide range of expertise so that experts can be seconded to a wide range of incubators to offer their specialisation. To give you an example I recently met with AusIndustry staff & requested how I should go about constructing an Incubator comprising of experts in Chemistry, Animal Science, Engineering, Transport, Solar Energy & waste Conversion Techniques.

It was then explained to me that this would not be achievable, as after promoting Innovation for so long there was only 1- Incubator in the whole of Australia, for which the Federal Government had allocated a Grant of some \$500,000. My Incubator would use expert consultants at a cost of no more than \$50,000. Why would the federal Government allocate \$500,000 to one asset rich Company such as Paspaly Pearls, when they could have funded some 50- Incubators at \$50,000 each. We would of been prepared to raise the balance of monies required for our Incubator. I believe that the funding of Incubators is the prime conduit to proving up our ideas & Projects.

I enjoyed the discussion on the day and having Dr Howard visit my operation in Brisbane. I hope our operation and "coal face" aspect of the innovation space was helpful in understanding what would really affect change and create more opportunities for innovation and more importantly commercialisation and job creation. Happy to help in anyway I can into the future.

I have a major issue surrounding the narrow definition of innovation. Further, to answer the Q in the survey, many assumptions needed to be made about the Q. I have worked across all aspects of University / CSIRO tech commercialisation, established over 20 startups with 4 technologies / capabilities ranked in top #1, 2 or 3 in the world, raised over \$8bn for projects of all natures and spent time in Government with Austrade promoting Trade Agreements, export marketing and inbound investment. I am of the view Australian efforts are disjointed, too small (I killed 12 of 19 projects in CSIRO as not going anywhere), flawed Federal policy and lack of domestic capital are reasons why Australia is struggling to build innovative businesses. Australia is falling behind. Why can I get 4× faster internet speeds (free) in Mongolia than I can on NBN in Melbourne!? Happy to discuss further. Jeff

I have been a Committee Member and Chair (2016) of the Engineers Australia Innovation Committee since 2011, I also have lectured innovation courses at universities. I find that innovation is in the Australian psyche but seems to be constrained by risk averse companies and lack of credible government support. We hear about innovation from government (politicians and public servants) but it seems that when the ordinary people want to invent a product/service and turn this into an innovation they are stifled.

I have been working in an international environment for some years which has limited my ability to comment on many questions. I still think Australian culture needs to embrace the skills and expertise of a highly educated workforce (e.g. higher degree by research recipients).

I have never seen an innovative entrepreneur engage with Government - suspicion and just getting on with it are major attributes! The culture within the Public Service is nearly always suspicious and anti-business - innovation is feared by the broadly - unqualified and inexperienced Public Servants - sadly.

I worked to pilot a national program that connected industry and research for five years. Universities do not want Australian SME engagement they want headline international companies for their media release. Also innovation is not impact!! The execution of an idea into a business, service or product is a mile away from activities like hack a thons or innovation days in companies. Where is the focus on innovation systems that drive and guide an idea to impact? We are a creative nation, so maybe our "innovation " focus should be weighted to impact and not just more money for new ideas.

I'm not sure how the results from this survey will be able to sharpen our innovation agenda. I haven't seen anything focusing on innovation in primary and secondary education, innovation funding beyond governments, enabling more competitiveness, etc....

I'm sorry, but I think a lot of these questions are based on false premises - and serve only to reinforce noninnovative (and ineffective) responses to the underlying issues. There are new approaches that could bring significant impact, demonstrated by research, with preliminary support from industry, that have not been picked up in the strategy development - and are not the subject of these survey questions.

In my experience as a lawyer, the primary inhibitor of public-private sector collaborative research has been template agreements used by research institutions in which the institutions want ownership of all IP, and expect industry collaborators to fund research in return for nebulous rights to (maybe) negotiate a licence of resulting IP if they are lucky.

In my experienced TTO's have always been professional, just not well funded and seen as peripheral. The major change is the broadening of scope to include other forms of commercialization and research translation but also a more entrepreneurial approach in some universities. Universities have to attract more foreign full fee-paying students to operate viably Geographic clusters to create critical mass opportunities are important - the challenge is how to connect them into an interdependent, cohesive innovation network. Continue to develop opportunities to assist SME's to engage and work with large corporates and universities (e.g. innovation vouchers, grants, mentoring). • Enable non-bank alternatives to debt finance for SME's (banks will not lend solely against business assets).

Innovation facilitators and independent intermediaries are under-utilised as a lever to improve research and technology commercialisation.

Innovation funding programmes are often too focused on start-ups at the expense of scale ups. Much of our effective innovation comes from established SMEs not just start-ups. Skewing funding to start-ups has the perverse outcome of creating spinoffs that may be better maintained in a larger enterprise. The general nature of the questions makes it difficult to differentiate between those institutions doing it well vs those that are not. E.g. some university innovation commercialisation offices do a great job, others not so.

Innovation is predominantly driven by individuals and businesses with rapid fail or adoption practices. This approach needs to be supported and facilitated by Federal Government (red tape reduction, hubs, seed and development grants, plus universities and other institutions, developing and utilising skills, expertise, etc. and fostering such activity and promoting study and careers through education (primary & secondary) systems, plus attracting talent, businesses, partnering and investment from abroad.

Innovation misses about 90 per cent per cent of small manufacturing companies.

Innovation needs to be about more than just business/industry and shouldn't only be driven by a commercial imperative. Social/human services will also benefit by changing practices such as renting rooms in aged care facilities to students as in Holland for better wellbeing outcomes. I also believe that we are over-using the 'innovation' word and turning Josephine Public off the concept. Instead could we be a bit covert about insinuating the philosophy of constant improvement into Australian culture? Shift the seemingly growing attitude of 'complacent prosperity' as Bernard Salt calls it?

Innovation occurs across the spectrum of technology, services, education, government and business and includes activities of both a national and international interest. Therefore, in many cases the responses provided were 'ambivalent' or 'neither agree or disagree', because any such response is dependent on the particular situation. Can Australia commercialise? Yes, and very well when properly supported. But regular reviews and restructures of every tech transfer office in the country has seen many of the leading individuals leave the sector in frustration.

Government funding programs are a great incentive for industry engagement in research. However, for many research activities it must be recognised that we are competing on an international stage and are generally competing against much better and longer funded EU, US or Asian activities. Therefore, any funding has to consider this and not be terminated at the whim of a new Government or ministerial appointment. A good example is the bionic eye project - a great initiative, off to a good start and then left to fail. Whilst some attempt is being made to start it again, we have lost time and certainly expertise that will be difficult to quickly recreate.

Whilst there has been dramatic improvements in the way University's interact with industry there is still a long way to go. Newer academics are generally better equipped than older academic staff, although again, this is not always true. Happy to elaborate or clarify any statements made or discuss further. Regards, Brenton

Investment in Innovation and Entrepreneurship Programs at a Primary and Secondary schools level is crucial to the development of current and future Australian Innovators and Entrepreneurs. This is an area that are Asian neighbours are far out performing us in Australia and will have future ramifications for our economic prosperity.

It is critical that Australian develops high impact national innovation policies and programs that remain in place for decades rather than the current chopping and changing practices.

Learn from industry successes.

Local City Councils and Mayors struggle to engage in innovation efficiently due to the fact that vast majority of innovations are in category of technology while their problems to solve are rather in area of social entrepreneurship and social systemics. Especially: - Diminishing job opportunities for professionals - Ageism at workplace - aging population - looking into improvements of current economic transactional system - measure profits by quality rather than quantity

Low cost fast wireless networks are also needed to allow IoT innovation to develop (current networks are expensive and clunky when compared to infrastructure in other countries). There are insufficient pathways for experienced engineers (and other professionals) to join universities to impart their experience from industry. There is currently a requirement for such individuals to have an extensive recent academic publication list - whereas industry often forbids its designers, engineers and researchers from publishing (other than patents). This disconnect means many talented and passionate people who could help train the next generation of innovators are excluded from the system.

Many of the questions are city-centric. The system is pitched against regional organisations. In Australia where decentralisation is a real issue R&D is one sector that could be established in rural centres - it happens in other countries. Your questions only got 100km outside the cities. Regional universities could be strongly supported to deliver in R&D but are largely uncompetitive with the forces established in the sandstone university conglomerate.

I am also of the view that the government plays up innovation but does little to facilitate it. There is nothing to innovate if there are no discoveries and there is little support for discoveries in this country so we import a lot of ideas and technologies that we could invent here. They set up structures to do stuff but give them no resources and they become a further bureaucratic hindrance in the research agenda.

Many of the questions in this survey can be answered in various ways, based on examples I have observed some good, some not so. I have seen an awful lot during my many years working in industrial R&D and innovation in USA, Europe, NZ and Australia. I think that a lot of this questionnaire only deals in "headline topics", but it is the substance and details of each issue which provide the potential for success, failure, or no impact, it is certainly not just the identification of the topic itself.

Many of the questions were either leading or confusing. In general, the preoccupation with centralising power to Government run Growth Centres, Science Priorities, and Government funded intermediaries is antiinnovation. Innovation cannot be filtered through a small number of people, that are in part, responsible for the current system. Programmes like the CRC programme should use business support as the basis for priority, not centrally orchestrated 5 year plans through Growth Centres.

Not enough emphasis on the multi technology roll out of the NBN and how that is creating a have and have not situation along geographical lines for businesses thus reducing their ability to communicate with clients, other offices and collaborate effectively to innovate with partners.

Policies should not assume that Universities are the only home of research

Public transport is a bigger issue than can be underlined in the survey as regional cost of living and education and availability of staff are compromised

Scale up finance and export development support beyond current options are critical and need to be considered as part of the solution

So many of the other innovation programs that govt have funded have done little more than survey the population and come up with reports that generally cover, more often than not, the lowest common denominator responses. I hope (somewhat forlornly) that this one will be different. There are a number of basic assumptions that need to be tested.

(1) Aust research "punches above its weight" compared to the global population (an absurd comparison). In fact, we fall well behind on OECD measures. We should be measured against our peers not the whole world (most of which are just spectators to research efforts e.g. Africa). Refer our Chief Scientist's report http://www.chiefscientist.gov.au/2014/12/benchmarking-australian-science-technology-engineering-mathematics/ A wakeup call, that was rather sadly ignored, when published. A message we just don't want to hear.

(2) Reframing innovation from tech push to market pull. The need for a "valley of death" has not been challenged – it is just assumed to be a "natural" barrier to entry.

(3) Govt procurement (market pull) can not only buy the outcomes of a transactional one-off research project, but could help fund local market development (e.g. NDIS payments) over time. Thought should be given to how consistent streams of Govt costs/procurement could drive the evolution of local markets – not as handouts but as payments for value.

(4) Social Bonds and more importantly their business cases should be used much more frequently to drive innovation, quality and cost efficiencies in govt services. This is a much smarter approach to what has been the direct outsourcing (and squeezing) of govt services over time.

(5) In Aust, we have incorrectly assumed that just because we have a bunch of co-located start-ups that we have a viable economic ecosystem. We really need to think more about rainforests where all parts of the ecosystem mutually assist each other in perpetual growth. The Kauffman ecosystem model is excellent because it focuses on flow as well as the capacity of various parameters. Most Aust "ecosystems" are stagnant because they haven't understood the element of flow. To keep it really simple, we can start with measuring the rate of flow of knowledge and money between all entities, then incrementally increase the fidelity of measures over time.

Note : Flow is measured in days not years. The system also needs to cover both entrepreneurial (start-ups) and interpreneurial (anchor organisations) activity. Some form of public dashboard is also vital – without visibility into the moving system, our participant roles and most importantly our influences, it's easy to become disengaged. And above that, in the words of Erkki Ormala, "economic ecosystems also need 'an orchestration mechanism' to propel the flow. The components in of themselves are not sufficient". Best Regards Steve

Some issues that come to mind that may assist in a broader discussion of issues associated with the future competitiveness and wellbeing of Australia. The current innovation system is unnecessarily focussed on the supply side of innovation (i.e. R&D and services supplied by Universities and PFRAs) without much if any focus on the demand side of innovation. Programs and support are desperately needed to positively impact this area.

There is too much attention paid to Technology based innovation and not enough on the humanities or human-centred aspects such as Business Model Innovation, design led innovation or behavioural economics. Given Australia's long term poor performance in a range of international comparisons of competitiveness much more needs to be done to understand and take action on issues identified - e.g. the translation of knowledge generation (which we do pretty well here in Australia) to capturing the value of knowledge generated (which we do not do particularly well in. This is more than just a focus on entrepreneurship (although this is important) - there is a need to also build a cohort of those in Australia's Business Schools that can take action - this is an aspect that has been neglected for far too long - Since the Karpin report the issue of lack leadership has been at the forefront of issues raised - yet despite the number of business

graduates since this time - there is little evidence that business schools have produced graduates that have made a difference (successes have been the exception rather than the rule).

There needs to be much more activity to grow the competitiveness of Australian SMEs. Far too many of them are not innovative (beyond minor innovations), they are not digitally focussed and able to take advantage from digitally focussed innovation (beyond using emails and having a web page) many are not export oriented and are not prepared for the complexities involved, far too many are risk averse and do not pursue innovation in a way that allows them to grow (unlike many in Germany for example). Accordingly SMEs need a discrete plan for growth across all sectors.

An observation re the University Sector - I observe that many if not most Universities have centres of excellence or research labs or such like - many funded by government. There is little evidence of the success of the bodies and there is certainly no evidence that they work together or collaborate to create critical mass to improve innovation outcomes. I also suspect there is much duplication in effort here - more than likely due to the competitiveness between universities. The development of communication strategies about the issues associated with technology development and the impact these technologies will have needs to be undertakes as a matter of urgency. There is too much fear about what technology is doing. This is especially the case in the digital arena - (much like the efforts associated with GM foods or nanotechnology) It should not be taken for granted that digital or its various applications will be accepted easily by the community (already we see the impact of fear in relation to jobs and local communities being devastated by the impacts of robotics for example).

Funding for Innovation has for too long been seen as a budget to budget issue - not a long term issue that requires funding and a strategy for the long term in Australia - this needs to change if Australia is to be competitive into the future. Funding issues are also compromised by being silo focussed into each portfolio department - with all of the administrative complexities associated with managing each funding arrangement separately. Much more can be achieved by thinking of innovation across all portfolios as one focus - with everyone on board. Many of the issues faced by Australia - be they related to health, aging, the environment defence industry funding or the like are all reliant on how we approach the challenges with an innovation mindset - there is therefore a need to build an approach that brings these issues together into a narrative that is relevant to all Australians.

Some of the questions are very specific to problems (and potential solutions) in particular sectors, i.e. they read like individual people's opinions on things that went well or failed in their given circumstances. This makes them, at times, difficult to answer from a general perspective of fostering innovation. As with much other research in this area, it would be helpful to be more precise about what innovation actually entails (e.g. basic science, technology, inventions, new service applications building on digital environments, design etc.). While some "innovation system related actions" may clearly foster all of the above, a basic distinction between basic science (and related invention), general purpose technology innovation, application or design driven innovation and improvement, etc. would clearly provide focus with regards to the programs or initiatives that could help foster either of these.

Some of us would argue that these questions have been addressed over many reviews and reports, including the recent Senate innovation system inquiry. The problem is not lack of recommendations, but lack of execution. This results from research and innovation being seen as a second order issue, when in reality it has to be at the forefront of consideration for government, business and academia if we are to make a successful transition to a competitive knowledge based economy.

Stop focussing on universities as the source for innovation, they are a source for research. What is needed are more innovation precincts, incentives for industry to commercially collaborate with startups and scaleups and SMEs Government procurement at all levels to have a policy target of sourcing from startups/scale-ups/SMEs from any country greater focus on how to help incentivise early stage investment in startups and scaleups current treasury measures are insufficient greater focus on understanding the future of work and the immediate interventions that are required at secondary and tertiary levels including VET and support for skills transitioning post primary qualifications Additional focus on where Australia has relativ3e competitive advantage to enhance its presence in global value chains assessment of where Australia must protect its strategic assets such as food, water, health and education to ensure they are protected, enhanced and high-tech enabled ensure that immigration policy is aligned with attracting top global talent. They dont take jobs from Australian's they create jobs for them.

Strong need for businesses to recognise and safely experiment with diverse forms of innovation best suited to them, not just high tech or new to the world R&D.

Thank you for the opportunity to comment in a personal capacity. I found some of the points were open ended which meant that they were difficult to respond to in a meaningful manner. For example: the point on 'A long-term government commitment to immigration will contribute to improved innovation performance in the future' could be interpreted as the government committing to limiting immigration or indeed supporting it, which would of course have different implications. I look forward to seeing the outcomes of this work.

Thank you for the opportunity to contribute. Some additional points: 1. The need for improved university/business interactions is critical for nation-building. 2. We need to address the imbalance between the infrastructure & capabilities in the research sector, and the equivalent in businesses commercialising innovation from the research sector. 3. The lack of a world class NBN is a significant disadvantage for many businesses. 4. As a nation, we should be setting realistic goals to have innovative companies in our top 10 - not just banks and mining companies.

Thanks for the opportunity. I missed the briefing but wanted to participate. My entire career has been at the interface between industry and academia, through Commercialisation Australia and predecessor grants (including SPIRT funding my PhD). With our new startup I am looking to develop a sustainable business, and then leverage universities to do long-term research that we are unable to do ourselves with our short term objectives. This does require building up a profitable business, and utilising the university sector to obtain smart employees seems to me to be the best strategy short term.

The biggest issue is cultural and structural barriers to mobility between industry, government, university and research sectors. It makes it very difficult for people in Australia to build the skills sets needed for innovation-based policies, research and businesses to succeed. The issue of government having an obsession with not picking winners was not addressed in the survey except in one question relating to risk. Other countries with successful innovation systems do not have such constraints.

The biggest problem is connecting investors with innovation that can lead to scalable commercialisation. Everyone expects govt to di the research. It needs to be carried across the full value chain in each industry sector. Encouraging producers to actively engage with contributing to innovation in their supply chain will improve outcomes across the value chain. R&D needs to be better extended. It needs to be freely available so that innovative solutions can be developed and more importantly commercialised.

The country does not lake inventiveness. Most of our education system seems to be focused on producing great employees what we need instead is great entrepreneurs. A KPI of our education system should be how many graduates start a business within 5 years of leaving.

The critical gap currently is the access to 'translational' funds - these sit between research and the commercial world and provide funding for a simple validation - "Does this discovery / invention / science have a commercial future" (answer Yes or No) - There needs to be a national translation fund, managed and administered by regional experts, who consider applications on an independent basis and manage the funds on a project by project basis. We already do this at the ANU as part of the Discovery Translation Fund - it is a blueprint worth looking at...

The cultural gap between university and business has received insufficient attention in these questions. Opportunities for business and universities to interact with the education sector and especially the schools sector should be stressed.

The current failures in innovation in Australia stem largely from the fractured nature of federalism. The best way to break this impass is for leadership at the Commonwealth level to drive innovation policy and fund initiatives that cannot be circumvented by State Government politics playing against each other.

The current short sited model in relation to the organisation and funding of engineering and science projects, research and innovation, inhibits the extent to which the private sector and academics can complete research and provide innovative solutions to the market. Funding and projects programming and planning should be provided with long term outlooks and foresight, and not restricted, constrained and at the mercy of the political life cycle of federal and state governments.

The Federal Government states on numerous occasions that they are not in the business of interfering with market forces, however we always see cases where the Federal Government does interfere with market forces thereby restricting progress and innovation. The Federal Government should also address and/or provide support in areas of market failure to stimulate innovation. Finally, governments across all levels should not be afraid to support/fund and/or back commercialisation activities, even if it means backing winners.

Although governments state that they are not in the business of backing winners, they have made an excellent effort in backing losers (e.g. GMH, Ford, Mitsubishi, NBN to name a few). Australian economic policy still has not learnt from the success of the South Korean government to support/fund SMEs during the dot com recession that resulted in the future development of billion dollar companies (employing large numbers of people and paying taxes back to the government at a high return on the initial investment). I don't believe that these Asian economies were blinded by neo-Schumpeterian policies. As part of Australia's future innovation policy let's focus on growing Australian SMEs and turning medium enterprises into billion dollar global companies.

The focus send to be on government and universities both proven to be ineffective in commercially developing innovation. Greater involvement of industry bodies and innovation "gazelles" is needed.

The following question "Local government statutory planning procedures limit the potential to stimulate innovation via supply chain 'pull-through' " should be directed at State Planning procedures NOT local. This is common feedback from business and is a major stumbling block to investment and innovation.

The gutting and denigrating of trades education for the sake of short term cost is appallingly stupid. The practical skills in the hands of smart people are essential to innovation

The piece missing in the Australian innovation system is Proof of Concept Funding that allows people to test whether an invention can actually be taken to market (the killer experiment or scale up or prototype etc). There is little funding available to do this inside research institutions and unis and the private sector won't take it on as it's too risky. This is where the market failure is and where innovation policy should focus.

The role and framework under which all tertiary educational and research bodies covering Universities, TAFEs, CRCs, CSIRO, Growth Centres et al, needs reviewing and rationalising to ensure there is minimal overlap, clear roles and responsibilities, clear measures of success and clearer methods of interfacing with the community at large. Likewise an independent publicly accessible repository which connects researchers, industry, government, finance industry (VCs and the like) whilst protecting trade secrets and proprietary IP is urgently required to ensure Australia's national innovation eco system is adequate to meet global competition.

The survey omits the distinction between small SMEs and large OEMs. SMEs are time poor, dollar poor, R&D poor, and losing qualified staff (aging staff) so are unable to make transformational change from old legacy manufacturing systems to smart high tech business models. This constrains their ability to do innovation research!

The survey questions presume that universities and public sector research is the main driver of innovation, however this fails to give adequate attention to the fact that, in ICT research- one of the main drivers of innovation- the vast majority of such research is in the private sector (and most of that not within multinationals)

The VET system is in chaos and needs to be sorted out urgently.

The word 'innovation' is now so over-used with Government that I seriously doubt many who use it could even define what it means. Those enterprises/individuals who are genuinely innovative don't speak about 'being innovative', they just are. The real challenge is how do we foster an environment that supports the implementation of great ideas, without choking the ideas with too much policy/red tape.

There is an opportunity to rethink the role of government in the digital economy. Data is the major factor of productivity for digital economy companies. Data driven, platform providers offering digital services can dramatically increase production and so productivity with minimal increases of the "traditional" factors of production: land, labour, capital and entrepreneurship. Data analytics has proven to be a transforming force in all sectors of our economy. The ability to join a wide variety of data sets, bringing new insights to a problem or system, is allowing industry and government to rethink their service delivery models. By understanding the engagement with government as a citizen-centric or company-centric experience through the touchpoints of data, it is possible to better understand the effectiveness of a service (or regulatory) model, experiment with different service delivery options and evaluate the effectiveness of different interventions.

There is much fantastic R&D work completed in Australia. However, at all levels of government (local, federal & state) there is an urgent need for fewer bureaucrats and more technically competent personnel charged with the very serious responsibility of interacting with business entrepreneurs and innovators, especially in the SME sector. Not all 'innovation' (note the inverted commas) is derived from academia, big business & big government. It is high time we realised that Australia has a very short window of opportunity and the SME sector who do engage in 'innovation', R&D need financial & mentoring support aligned with IP security. Up to that point it is often forgotten that they have taken all the risk, no-one else has shouldered that burden & SMEs need assurance they can translate their IP into exportable goods & services. On a final note & irrespective of a project's progress along the 'R&D supply chain' why doesn't Australia have an IP bank & an 'innovation' register? Thank you for providing an opportunity to participate in the survey.

There needs to be more vehicles for access to capital for good university generated IP and technology. In the same vein, perhaps there needs to be more training on the capital side on how better to deal with universities. (Eg. In funding a university spin-out company)

There should be brainstorming sessions to further innovate the bases for making policies.

There were almost no parts of this long questionnaire that addressed the broader public sector, social and creative innovation agendas. As such, it was too narrowly focused on government-business-research links.

These questions are loaded: involving multiple assumptions which does not allow identification of the core underlying issue. Very difficult to make a simple agree / disagree response when so many issues are packed into each question. This survey risks reinforcing the existing perspective and ongoing debates about innovation, rather than suggesting new approaches.

This is not a one dimensional issue, innovation and technology driven industry is more like a three dimensional matrix and there are no wrong or right answers. The interactions of decisions need to be better understood

To optimize the exploration of the national energy security, the focus of innovation should not be limited to certain priorities that are driven by current pressing issues like 'climate change' and moral issues. Although such issues are important and requires consideration, but innovation should be more inclusive of all probable proposed solutions that has sound basis, economically stimulating and can be subjected to continuous improvement. Thus, the policy should not be construed as limiting to certain priorities, that could shelve potentially significant development of innovations outside of the limiting priorities.

Universities, state and federal research service providers are innovation-sapping competition. Funding agencies are conflicted in their funding allocation - with too many short-term aims and opportunities.

We need a shared, bi-partisan vision of the future which connects the innovation strategy, along with measurement and milestones. What do we want Australia to be known for? What are our strengths, weaknesses, opportunities and threats as a nation that we can leverage a competitive innovation platform from. Maybe 'innovation' is the wrong word. How are we as a nation going to grow and be competitive in the future? Maybe the focus on the 'growth' as an outcome will help unlock innovation. We seem to have a lot of innovation initiatives occurring across local, state and commonweath agencies but they don't feel linked up. If they were, although I can't imagine they will ever be, we could harness some focus and power behind our innovation effort.

We need to have a major review on education particularly in vocational training and universities to better align skills to industry needs - disruption is going to unlock serious flaws in the sector.

We should be clear that innovation is not something new. Companies are innovating everyday and the idea that innovation needs significant investment is wrong. Collaboration is needed to maximise the effectiveness of our innovations and commercial (take to market) assistance would be far more useful.

We will be able to realise innovation and its economic outcomes in Australia if excellent research and engineering but sound business management capabilities are applied. Australian government policies and initiatives should encourage commercial activities in private sectors by eliminating impediments for development of such capabilities.

What we need is a bipartisan approach. There is no confidence in that occurring. Universities must not control innovation or innovative ecosystems in general - in certain cities, with certain universities this maybe effective. Innovation must not be owned by the universities or the government - their bureaucracies create blockages and slow processes - politics come into play.

When I sat in a meeting with bill shorten and our local mayor and I mentioned the need for local innovation infrastructure the mayor said "I don't have time for that nonsense". Bill Shorten was silent! Priority should be given to a plan to educate government on their role in this process!

