



**KEYNOTE ADDRESS TO THE R&D COMMERCIALISATION
CONFERENCE**

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AN AGENDA FOR AUSTRALIAN GROWTH

Good morning. It's good to be with you at a conference that is grappling with a crucial question in sustaining Australia's prosperity. How do we go from new knowledge to new (or renewed) businesses? And at a larger scale, new industries and a more diverse economy?

We meet at a critical time. In a couple of weeks the Federal Government will hand down an early Budget. A few days later we will probably be in the midst of an election campaign.

I am not going to dwell on politics today. My organisation, the Australian Industry Group, keeps out of the partisan fray so we can work with any potential Government to meet the needs of businesses large and small, their employees and the communities in which they operate.

But whatever happens at the election there will soon be a freshly elected Government and a new Parliament. The future of industry and researchers is about much more than what governments do. Nonetheless choices made in Canberra can help or hinder us all. What do we want the next Government to do – or avoid? Ai Group has been working with members to answer that question, and in the process we've been taking stock of where we are, where we could be, and how we get there. Today I want to take you through that work.

The state of play

Let's begin with the immediate state of play.

Global growth continues but it appears to be weakening; the IMF forecasts output growth of 3.5% in 2019, down from 3.8% in 2017; the advanced economies and China account for most of that slowdown. There are many unresolved global risks in 2019 that could impinge on growth now and for years to come, including the ongoing drama of Brexit, the slowing and changing Chinese economy, and trade tensions – particularly between China and the United States.

In Australia multiple signs point to economic deceleration, though not recession. GDP growth estimates for the back half of 2018 were exceedingly weak, albeit still positive. Ai Group's performance indices for the Construction, Manufacturing and Services sectors collectively show that the slowdown has continued into 2019. The NAB Business Conditions index tells a similar story. Meanwhile consumer confidence has declined, with higher fears of unemployment and different indices varying from mildly negative to mildly positive. Drought, flood and fire have taken a heavy toll on the regions over the past summer – and on related supply chains nationwide. As recently as December the Treasury still forecast 3% GDP growth for 2019-20; we'll see their next update with the Budget in April.

Profitability improved for more industries in 2018, lifting their ability to hire and invest. Profits remained dominated by mining and finance, however. Manufacturing profits have been squeezed by higher input prices, especially for energy-intensive manufacturers. Since 2010 manufacturing input prices have risen 21% while selling prices have risen only 19%; electricity and gas input prices rose 84% and 48% respectively.

Trade exposed businesses that reshaped themselves to withstand an Australian Dollar at more than parity with the US Dollar were well placed when the dollar fell. The lower dollar of the last few years has supported growing export volumes across all product categories, especially resources. Within manufacturing, metal products, food and building materials exports have grown strongly. It is anyone's

guess where the volatile dollar will go next, but at around 71 US cents the Aussie is modestly below its long-term average.

Population growth remains a substantial driver of overall economic growth, with net migration and birth rates since 2005 averaging well above the levels of the preceding fifteen years. Unemployment is down to 5.1% and employment has been growing strongly. In the year to last November, new jobs were dominated by public administration, manufacturing, professional services, mining and health. NSW and Victoria hosted most of those jobs, with much lower employment growth rates elsewhere.

There is still room for more jobs growth, with underemployment at 8.4% and underutilization at 13.4%. Under-utilisation, together with weak productivity growth and low inflation, is why wages growth has been slower than most workers want. Low inflation also means that most industries are still generating modest rises in real wages. I would note, though, that two of the sectors where real wages growth was stagnant in the year to September 2018 were Media and Public Administration – this is one of those times when the economy really does look worse specifically for the people who tell us how it is doing!

Productivity growth weakened in the past few years and was negative in 2017-18, with multifactor productivity falling 0.3% and labour productivity falling 1.3%.

In short, the Australian economy today faces considerable uncertainty. We have been doing well, and the slowdown may prove to be a blip. But the possibility of deeper problems here and overseas is weighing on sentiment now.

If we pull back a bit from the metrics of the moment and take a wider view, Australian economic growth has been gradually decelerating for decades, and more of that growth is coming from adding more people rather than doing more with each person. Resources are a bigger part of our economy than they used to be, but their sometimes-giddy, sometimes-painful cycles highlight the value of economic diversity. Manufacturing has contracted as a share of employment and overall output, but remains much stronger and more vibrant than many people perceive.

Digitalisation

The state of manufacturing deserves additional focus because of the digital transformation it is currently embarking on, and because many of the steps needed to make the most of digitalisation in manufacturing are also needed for our wider prosperity.

Most of you will already be familiar with Industry 4.0. But in short, this is the latest wave of profound change to reshape industry over the past few centuries. Previously industries have risen, fallen and been radically transformed as they unlocked the potential of steam power, then electricity, then computers and basic automation. Today they are grappling with the possibilities of full digitalization, where both production processes and the ultimate products themselves are connected, data rich and controllable. Production and products can be more efficient, tailored and flexible than ever before.

Individual businesses and Australia as a whole need to get a few things right to walk the road of Industry 4.0 and to take advantage of the opportunities it presents.

We need the ambition to excel, grow and learn, rather than settling for stasis or decline.

We need to cultivate innovation at every level, whether that is moving to the state of the art or advancing it.

We need collaboration between businesses, researchers, governments, institutions and workers to make the most of our resources.

We need a robust technical infrastructure of standards and frameworks that give us global compatibility and local access.

We need rock solid approaches to cyber security if every part of production and every product is potentially hackable.

And we need the skills in our current and emerging workforce and management to make the most of all this.

It is fair to say that substantial progress in embracing Industry 4.0 has so far been confined to a relatively small number of leading firms – both multinational and domestically-based. Embracing Industry 4.0, whether under that name or others, has stretched the gap between these leaders and the majority of businesses.

In many cases these businesses are the usual suspects – those who are known to be proactively on the lookout for opportunities to improve and develop their businesses. In an important sense these businesses self-select. They are switched on, aware of the latest developments and they allocate time and resources to “working on the business”. They are also more generally aware of various policies, programs and measures available to support industry development and innovation.

Their experiences are being emulated by the early adopters and this diffusion is assisted by important intermediaries including businesses supplying, servicing and optimising capital equipment and a considerable range of business service providers. The diffusion process is evident in the number of conferences, the extent of coverage of Industry 4.0 related articles in industry-focused media and by the flow of reports by different levels of government and their agencies.

Key to accelerating the diffusion of Industry 4.0 is ensuring there is a sufficient and growing supply of appropriately skilled people for businesses to draw on as they embrace Industry 4.0. This involves industry and education and training organisations working closely to design and develop an appropriate range of training opportunities both for the existing and future workforce.

The increasing frequency of reports of skills shortages relating to the adoption of Industry 4.0 approaches suggests that current capacity is constrained. But more encouragingly it also points to an increased pace of adoption and further diffusion of Industry 4.0 beyond the leading firms. In this sense there is reason to be optimistic that with appropriate policy support, including in relation to workforce development initiatives, there is strong scope for further acceleration over the next few years.

There are other barriers. We have heard anecdotally from members about possible reasons for the slow adoption of digital technologies, particularly among SMEs:

- They do not have the time to assess digital technologies to know what's relevant to them and what the benefits may be;
- They do not know where to start or whom to trust;

- They would like to know what others are doing to determine the benchmark; and
- The speed of change makes it hard to keep up and adapt, even for innovative manufacturers.

We have also heard from both end users and suppliers that while there may be interest from businesses in digital technologies, the real challenge is the development and implementation of a real business case. This is harder where skills or knowledge of industry 4.0 are thin.

I'll return shortly to the policy responses needed to respond to digitalisation. But there is much more change coming our way.

What's next

Megatrends visible today hold great opportunity for Australia – and some dangers. I'll single out five.

Technological change is unsettling many product and service markets. The shift to Industry 4.0 is just one front; electric vehicles are another, with Volkswagen for example targeting 40% of its vehicle sales to be electric in ten years time. Online is shaking up traditional retail. In these and many other contexts, current players have got to work hard to keep up, and new entrants may displace them.

Some kinds of activity are being automated, while skilled, flexible and creative labour is increasingly necessary for others. Highly skilled economies will be well placed, but transition could still be very painful for many workers.

China is becoming a higher-cost producer with more regulation and a rapidly ageing demography – but also an increasingly wealthy and important consumer market. Re-shoring to advanced economies of activities once off-shored to China is not just conceivable, it is happening. Other low-cost countries do not seem set to replicate the low-cost role China played – at least not at the same seemingly limitless scale.

The international liberal order on trade and democracy is under increasing challenge. Australia feels those pressures too, but as a small diverse nation and a very open trading economy we have more to lose than most.

A successful global response to climate change will ultimately require most countries, including Australia, to reduce net emissions to zero or below. That will involve huge technological change and investment across many sectors, and could radically reshape patterns of trade.

Whatever immediate challenges the next Government faces, we need to navigate through these long-term trends to maintain and increase sustainable prosperity.

The rewards could be huge, as could the losses if we get it wrong.

One example

Let me explore an example: hydrogen.

Hydrogen has been in the news a bit lately. CSIRO touted a roadmap and a new membrane technology for converting hydrogen into easier-to-handle ammonia and back. The COAG Energy Council has asked for a national hydrogen strategy by the end of the year. Both sides of Federal politics are talking about hydrogen opportunities and exports. A handful of pilot projects are taking shape.

The underlying reason for the interest is climate change. A lot of climate discussion focusses on electricity generation, where renewables have made great strides in cost reduction. But electricity is just one source of emissions – in Australia today, about a third of the whole. What about the transport, heating, heavy industry, construction materials, agriculture and the rest?

There are many potentially relevant technologies, but hydrogen is one of the most widely applicable. Today we mostly use hydrogen to make ammonia for fertilizer and explosives. But you can also burn hydrogen for high-grade industrial heat, or blend it into domestic gas networks. You can turn it into power in a fuel cell to run an electric vehicle, or process it and capture carbon dioxide into synthetic fuels that could be dropped in to existing trucks, ships and aircraft. You can use hydrogen instead of coking coal to reduce iron oxide when making steel.

Suppose that hydrogen turned out to be the best solution for all these things, beating out electrification, biofuels, carbon capture and storage and other options. In that case global hydrogen demand would ultimately increase roughly tenfold to more than 600 million tonnes per year.

Today we make nearly all hydrogen by processing natural gas, with waste carbon dioxide vented to the atmosphere. For a decarbonizing world we could make hydrogen from gas or coal with carbon capture and storage; or we could use zero emissions electricity to electrolyse water. CCS is a much cheaper add-on to hydrogen manufacture than to electricity generation, since separating the carbon dioxide is the most expensive part and this is already necessary to purify the hydrogen produced. Electrolysis is currently very expensive, though improved electrolyzers and falling renewable energy costs could eventually make it the cheapest option.

In 2017 Australia had 19.2% of the global LNG market; we're blessed with huge resources, we are a relatively stable and well governed country (despite high turnover at The Lodge in the past decade), and we've been able to become an energy superpower, though not without side effects. Suppose we aimed for a similar role and a similar share in the global hydrogen market we just envisaged, mostly with electrolysis.

Making more than 100 million tonnes of hydrogen a year through electrolysis would require nearly 6,500 terawatt hours of electricity – or more than 25 times all the electricity Australia generates today for all purposes. That is not physically absurd; for instance, solar farms to supply the power would require about half of one percent of Australia's land area. But it would be economically colossal, involving investments that would dwarf the transformation of our resources sector over the past decade.

Now for some caution. In reality hydrogen probably won't be 100% of the answer to decarbonizing all those sectors; lots of effort is going into improving batteries, bioenergy will certainly be important though scale-limited, and CCS is about to see a burst of activity in the United States thanks to generous tax breaks.

It's also uncertain how fast the world will move to decarbonize. Fortunes could be lost on big bets that are ultimately right, but are made five or ten years too early.

Most especially, Australia is not guaranteed to achieve the kind of share in hydrogen that we have in LNG. Middle Eastern petro-giants like Saudi Arabia have a lot of sunlight and a lot to lose if demand for oil declines. They will be competing hard for whatever hydrogen market emerges.

But Australia has a lot at stake too. The IPCC assessed 85 scenarios where the world holds temperature increases below 1.5 degrees. On average, by 2050 global demand for gas shrank by a third, and coal demand was down more than 80%. Less ambitious global responses to climate merely slowed the loss of demand. Whatever the quality of Australian coal and our skill at mining it, big demand losses will inevitably hit the prices and volumes achieved for what is currently our leading export.

Ready for anything

So we face potentially rough times ahead for some major exports, and plenty of competition for the new opportunities that might fill the void. We can speculate about other similar situations.

- Rising costs in China and increasing automation raise the prospect that Australia could expand as an advanced manufacturer – but many others are trying to do that too, China not least among them.
- Energy intensive manufacturing could be a particular opportunity given our high quality and large-scale energy resources, but we are currently unable to turn those resources into power at a price as low as other countries with lesser endowments.
- A burgeoning global middle class will demand more tertiary education, but the quality of institutions in emerging economies will increase too.
- Demand for meat and high-quality food will rise, but meat analogues, changing consumer preferences and changing climate may see the ground shift beneath the feet of Australian suppliers.

Many of the drivers of these scenarios are beyond our control; if they happen we will have to respond. Australia's capacity to manage the risks and capitalise on the opportunities will depend on our ability to innovate locally and to rapidly adopt advances made elsewhere. We will need not only to get new ideas into the marketplace, but be able to attract and sustain the investment needed to scale them up – potentially a very long way.

During the most recent mining boom, resources investment peaked at more than 8% of GDP per annum. This involved strain on costs and wages as the construction and engineering sector grappled with delivery; plenty of growing pains for other sectors struggling with heightened costs and currency impacts; and a hangover for those at the heart of the boom when construction eased off.

- If the next big thing involves anything like the scale of the hydrogen example I just offered, Australia will need to handle it much better than we did the mining boom. That will require:

- Substantially greater flexibility and efficiency in delivering projects of all sizes – and across our economy. A healthy, productive workplace relations environment is essential to this.
- Education and training systems that can deliver high quality skills, shift to meet and anticipate demand, and help existing workers re-skill throughout their careers.
- A range of innovation, business capability, digital and infrastructure policies that support dynamic and competitive industries, not just the preservation of the status quo.
- Energy and climate policy that is durable, investable, efficient and trade-neutral as we head towards net zero emissions in the long term.

And whatever happens, we are also going to need to manage the costs and impacts of change on those sectors, communities and workers who may otherwise be harmed.

Ai Group will shortly release a set of policy papers to guide the next Government towards this path and ensure we are ready for anything. Today I'll share the headline messages from those papers.

Industry policy

I'll start with Industry policy.

Australian industry is diverse, strong and poised to pursue new opportunities through digitalization, innovation, participation in global markets and supply chains, and responses to the challenges of emissions reduction and reducing waste. At the same time, there is a clear role for public policy in developing our businesses - particularly our small and medium-sized businesses whether in new or traditional sectors and equipping them in raising their horizons and their competitiveness.

Ai Group maintains that Australian industry policy should have a positive, 21st century orientation. It should work, together with policy in education and training, to support a confident, dynamic and resilient private sector that not only builds on existing competitive advantages but is equipped to meet both the challenges and the opportunities presented by the transformational forces of globalisation, technological development and environmental protection.

The Federal Government can play valuable roles:

- In coordinating a broad and inclusive discussion of the future of industry;
- Providing well-designed policies to improve business capabilities including in relation to the digitisation of commercial activity;
- Facilitating greater opportunities and increased involvement in international trade by Australian businesses;
- Ensuring that, in meeting Australia's Defence needs, full advantage is taken of the unique opportunity to grow competitive Australian industries and further connect them to global markets and supply chains;

- Ensuring that Australia’s innovation system is stable and effective in supporting business research and development, collaboration between business and Australia’s research capabilities and supportive of the emergence of deeper markets for early-stage capital.
- In cooperation with the states and territories, give particular attention to addressing the ongoing crisis facing our waste and recycling systems due, most immediately, to China’s clampdown on the contaminated plastics we previously exported for processing; and
- Incorporating the latest evidence and analysis into evolving strategies for growth and successful transitions of Australia’s industry through a period of immense change.

I’d like to expand on the innovation issue. Innovation is critical to better outcomes for Australia’s people, economy and environment, and essential to maintain and improve business competitiveness.

One of the major ways that Australia currently supports innovation is through the Research and Development Tax Incentive. The Incentive has been heavily and repeatedly amended over the past decade. It is becoming unstable and unreliable, making it harder for it to underpin sustained increases in innovation investment.

In the 2018-19 Budget the Government proposed a major net reduction in financial support for innovation, primarily through new brackets and rates for claims under the non-refundable incentive, which vary according to the intensity of the claimant’s innovation spending as a share of their total cost base.

The effect of the latter change is that the small minority of claimants spending more than 13.5% of total costs on innovation may see an increase in the value of the incentive, while the overwhelming majority of businesses with R&D intensity below this level will see the value of their claims cut by up to half. The intensity steps between brackets are so large that most businesses would have to make impractically large increases in their research budgets to qualify for a higher rate. Businesses that are successful in commercialising innovation and growing production and sales will naturally see an increase in these parts of their cost base, reducing their R&D intensity.

As a result, the proposed system does not provide positive or effective incentives.

Nor does it help much to clamp down on abuses and target genuinely innovative activity, since the intensity steps reduce the value of most claims irrespective of merit.

The concept of a stepped rate to encourage the most innovation intense businesses is a worthy one. But the specific version proposed is simply a reduction in support for innovation.

The next Government should:

- Not proceed with the currently proposed version of stepping the R&D Tax Incentive rate. Improved data analytics to assess the novelty of R&DTI claims would be a better way to focus the program;
- Commit to much-needed stability for the Incentive and maintaining a strong envelope for innovation support overall, including Cooperative Research Centres, Industry Growth Centres and broader research funding; and

- Provide additional funding of Defence research and development and innovation programs to help boost the ADF's capability edge, including a review of the national security innovation system as a whole.

Lifting the frequency and quality of collaborative innovation between Australian businesses and our substantial capabilities in scientific research is essential to improve competitiveness and open new commercial opportunities. The next Government should:

- Continue and expand the Innovation Connections element of the Entrepreneurs' Programme;
- Consider wider access beyond EP to incentives for employment of recent STEM PhD graduates in innovation roles;
- Do not introduce a higher rate of R&D Tax Incentive for collaboration until and unless the practical difficulties of assessing collaboration with sufficient rigour and minimal costs can be overcome;
- Promote case studies and best practices for collaboration to both business and researchers, including the benefits of cross-organisational teams and deeper 'stage zero' collaboration that starts from problem analysis rather than contracting out solution delivery;
- Assess the success of the Commonwealth's efforts to link public sector research funding to industry collaboration and real-world impact, and refine the formulae and metrics if warranted in consultation with industry and the research community.

Skills

Let me turn to skills and education.

Ai Group sees the critical role that education and training plays in the economy and the broader community in addressing workforce skill needs. The transformation of our economy is leading to skill mismatches and shortages due to the new tasks and jobs that are being created. Better skills alignment requires more regular skills forecasting to identify specific skills in demand.

Critical shortages exist for Australia's STEM workforce. Ai Group calls for measures to grow and strengthen our STEM-qualified workforce through a national STEM skills strategy led by government and industry. Ai Group is helping to address this gap through its Industry 4.0 Higher Apprenticeships Program, which provides a key platform for the delivery of workforce skills through an employment-based learning program.

The constant reskilling and upskilling needs of industry means that businesses require more support for workforce planning. To assist this, industry requires access to programs that are flexible in length and mode in both the higher education and VET sectors.

With literacy and numeracy levels a constraint on business effectiveness, Ai Group urges the funding, development and promotion of a national workforce language, literacy and numeracy strategy and program, developed in partnership with industry. The program must incorporate the development of digital literacy skills.

Australia's youth unemployment rate is concerningly high. Increased investment is needed in transition programs that equip individual young people with the right skills to enable them to more fully participate in the workforce.

Australian industry needs its apprenticeship system to grow. A number of measures are needed for it to sufficiently meet industry's needs, including a national body to oversee the system.

Ai Group has released a paper, *Realising Potential: Solving Australia's Tertiary Education Challenge*, which calls for a more coherent and connected higher education and vocational education policy and funding framework.

Workplace Relations

Workplace relations looms large.

Australia's approach to workplace relations – characterised by enterprise agreement making and a safety net of awards and legislated minimum standards – is a central pillar of the contemporary Australian economy and its record of income growth and improved employment opportunities.

The flexibilities in Australia's current workplace relations system, compared with the highly centralised arrangements it displaced, have been pivotal to the resilience of our economy over recent decades in the face of some extraordinary real-life stress-testing. Continued flexibility is central for further economic and social success.

In recent years the enterprise bargaining system has suffered from an excessive focus on technicalities rather than on the facilitation of agreements genuinely reached between employers and employees. Some of the problems are the result of poor drafting of provisions of the Fair Work Act, but the drafting problems have been exacerbated by unions searching for and pursuing every possible legal argument against the approval of enterprise agreements that they do not support.

Genuine enterprise bargaining has an important ongoing role and the ACTU's demands for industry bargaining must be entertained. The idea of giving unions the right to take lawful industrial action across entire industries, as the ACTU wants, is so obviously against the national interest that all political parties need to come out and decisively reject the idea.

In addition to maintaining the flexibility to reach a genuine enterprise agreement that suits their needs, employers and their staff need the flexibility to agree on what type of employment or engagement suits their needs – full-time, part-time, casual, independent contracting, labour hire, etc.

The Fair Work Act needs to be amended to define a 'casual employee' as an employee engaged and paid as such, consistent with the very widespread industry practice. The vague and unworkable concept of a casual that has arisen from the Federal Court's *WorkPac v Skene* case needs to be overturned by an amendment to the Act. Also, proposals for more regulation of the 'gig-economy' must not become a vehicle to increase the regulatory burden on all businesses.

The ACTU is proposing a substantial dismantling of Australia's workplace relations system and a removal of the flexibility that has been so fundamental to our success. It supports these proposals with claims and assertions that range between the highly misleading to the blatantly incorrect.

One example is the ACTU claim that casualisation is increasing in Australia. The ABS stats show that the level of casual employment is the same today as it was 20 years ago – about 20% of the workforce.

Another example is the ACTU claim that the jobs of Australian employees are being replaced by ‘gig-workers’. The fact is that ‘gig workers’ represent less than one percent of the Australian workforce and a large proportion of these workers are studying or working in other jobs, and are very happy with the extra income and flexibility that working for Uber, Airtasker or Deliveroo provides.

Everyone benefits from flexible work arrangements.

Energy and Climate Policy

Finally, let me address the challenges of energy and climate policy.

Reliable and affordable energy are necessary for our economy and society to prosper, as is a successful response to climate change. These are abiding challenges that will require coherent and dynamic long-term strategy - and substantial ongoing private investment, beyond the undoubted role for public funding and finance in research and innovation. Risk, uncertainty and a lack of strategic context are serious barriers to that investment. While some risk is unavoidable, especially given the massive technological and market changes impacting energy worldwide, government policy can provide a clear and stable basis for investors to plan around. Unfortunately, deep political conflict over energy and climate, particularly at the Federal level, has made public policy into a glaring source of uncertainty inhibiting the investments we need.

This situation needs to stop. It is imperative that the next Government develop climate and energy policies that are well integrated, credible and durable responses to our long-term strategic challenges. If we continue with a succession of rapidly reversed policies or no policy at all, at best we will see a patchwork of more costly State and localised interventions, and at worst we will see energy disadvantage cemented and emissions targets recede.

The next Government should:

- Cement durable frameworks for energy and climate, the lack of which is a serious barrier to needed investment;
- Pursue a new energy advantage by improving energy productivity, lowering the cost and risk of investment, encouraging competition, making provision for likely scenarios and ensuring policy can cope with surprises
- Ensure that deeper emissions targets over time are consistent with continued and increased prosperity, by ensuring policies are trade-neutral and facilitate successful industry transition;
- Adopt climate policy measures that collectively access emissions reductions from across the Australian and world economies and operate at least cost; and
- Work with industry, employees, States, local government and community organisations to develop effective and proactive responses to anticipated closures or transitions of existing emissions-intensive facilities.

Conclusion

Ai Group will release more detail in all these areas in the next week or so. It is, to say the least, a big industry agenda. There will be many pledges and ideas from all sides of politics over the next two months. There will be much else for the next Government to deliver.

But the agenda I've laid out today is one that will remain relevant whoever wins. The underlying needs of industry will be the same. The risks our economy faces, and the options for new sources of growth will remain. And our immense potential will still be there, waiting to be unlocked.

Thank you all.