

“National Innovation Strategy to 2030 – What should we expect?”

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Check against delivery

In less than 3 weeks, Innovation and Science Australia (“ISA”), the independent statutory board which I chair, will deliver its national innovation strategy report to the Federal Government. This is a strategic plan for how Australia can materially improve its innovation performance out to the year 2030.

So what will it say, what will it recommend? Obviously I hope you will all read the report once it is released and many of you attending this AFR Summit have already contributed to our extensive national consultations and submissions process. I thank you for doing so.

As a Board we started with a thorough review of the national innovation, science and research system. ISA published this review in February 2017, with its key findings confirming that our continued excellence in knowledge creation is not being accompanied by a similar excellence in the application and the commercialisation of our new ideas and prototypes. This shortcoming has accompanied a slide in our rankings in the world innovation stakes. Later this morning, you will hear more from the Deputy Chair of ISA, Dr Alan Finkel, about the serious limitations of some of the metrics used for these world rankings.

While our 26 years plus of unbroken economic growth is literally a world record, the efficiency of our principal tradeable sectors, mining and agriculture, have underpinned much of this performance. Their contribution derives not just from serendipity and natural endowment but, also from sustained innovation and risk taking.

The good news is we are an inventive lot. From the stump-jump plough enabling broad acre farming, to penicillin, to atomic absorption spectroscopy, to the black box flight recorder, polymer bank notes, xerography and X-ray crystallography, the pacemaker, cochlear implant, sleep apnoea therapy, from novel plants and seeds to Wi-Fi from CSIRO, the vaccine for cervical cancer, spray-on skin repair, , helicobacter as cause of ulcers, and so much more. And take note of the latest breakthrough (announced last month by WEHI) of a new leukaemia therapy, Venetoclax, which carries the promise of stunning health improvement outcomes for leukaemia sufferers worldwide, and has already provided WEHI with hundreds of millions of royalty dollars.

As hugely impressive as all these examples are, the evidence is also clear that in recent years we have fallen behind the rate of innovation achieved elsewhere, among our OECD competitors and others including Israel, Singapore, South Korea and Taiwan, and China.

This slippery slide has accompanied Australia's widening competitiveness gap to other developed economies, driven by declining productivity. (See graph of G8 countries and NZ). This is a graph we need to turn around.

Okay, so what would ISA want Australia to look like in 2030?

ISA's Vision for 2030. Our board of 15 practitioners landed on a common vision:

Our Vision for Australia in 2030 is very clear:

"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 current and future generations to have meaningful work, and a great quality of life, in a fair and inclusive society."

How we get there is the challenge for our strategic plan.

A core theme of this AFR Summit is Industry 4.0, or as the WEF originally badged it, "The Fourth Industrial Revolution". You will hear from several speakers about the opportunities and threats this 4th revolution is already presenting our economy and society.

The explosion in "the internet of everything" globally, of large scale data collection and analysis, with machine learning and artificial intelligence, has unleashed an avalanche of new ways of solving problems, making things and doing things differently potentially a golden age for innovation and humanity. However, many commentators suggest this will result in a utopia for few and a dystopia for many.

What do you think? My own view is that, as this fourth industrial revolution rolls out we will have some tough choices to make (e.g.) how we configure regulations to foster new technologies whilst protecting important citizens' rights; how we ensure our education system is flexible enough to help people through the many transitions future careers will require; and how we can deliver prosperity with fairness across the entire nation, perhaps with safety nets and even universal income support.

The one choice we do not have, however, is to stand to one side as this revolution unfolds. Other nations are moving swiftly to take advantage of the new dynamics of a knowledge-rich and digital economy, creating the jobs and industries that will underpin their own prosperity. The race is on,

for talent and growth: Did you notice China's recently published "Made in China 2025 Plan" with its target share of world markets including:

- I. 60% of all robots
- II. 40% of all autonomous vehicles
- III. 75% of all materials used in renewables

In the research piece "Digital Australia: Seizing the Opportunity from the Fourth Industrial Revolution", McKinsey calls out the challenges facing Australian business in harnessing digitally enabled innovations and observes that many of our businesses will struggle with the "curse of incumbency", aka the difficulty of self-disruption. Consider what the media and communications sector has been experiencing in recent times. This chart shows the time to reach 50 million customers, it took radio 38 years, then television only 13 years but only 1 year for Face-book!

This data underscores how the rate of innovation has dramatically accelerated no longer do business and societies have years to contemplate and prepare for disruption.

Think of this Industry 4.0 potential for disruption in the healthcare sector. In a recent discussion with Professor Mark Kendall, the Australian inventor of the nano-patch vaccine delivery (an alternative to needle injection), I asked where he saw the healthcare wearables business by 2030. He said that on-the-skin wearables and especially through-the-skin micro-wearables will be the quintessential demonstration of industry 4.0 products and services, enabled by the internet of things, where the "thing" is the human body. Real time collection and analysis of data from both well and unwell wearers will enable earlier and better diagnostics and prevention. And by 2030 Kendall believes some important medications will also be automatically delivered by these devices. He is one of several thought leaders in healthcare who believe that the fourth industrial revolution will deliver a positive and transformative shift of knowledge and control into the hands of consumers, in this case patients, from GP's and traditional service providers.

Staying with healthcare, two recent projects funded by our newly established VC fund, the \$500Mn Biomedical Translation Fund (BTF) illustrate the intersections of technologies and skills enabled by Industry 4.0. Saluda Medical with its novel chronic pain solution involving spinal cord nerve stimulation via a surgically implanted micro device and, Rex Bionics, the manufacturer of a robotic chair enabling paraplegics to "walk again" these are both splendid Australian examples of how Industry 4.0 may help deliver extraordinary quality of life improvements. And both require advanced manufacturing, new technology and new skilled jobs.

A nearer term example of this industry 4.0 impact can be seen in another of our internationally competitive sectors, namely agriculture.

The Future Oysters Cooperative Research Centre is pioneering the application of a technological solution to the disease and contamination issues currently facing the oyster industry.

Australian oyster yields have been in decline, particularly due to the disease, known as POMS, Pacific Oyster Mortality Syndrome. Major Tasmanian oyster farms have seen 70% of their harvests wiped out by the POMS virus.

The Australian agtech firm 'The Yield' has been working with the CRC Group and oyster farmers to produce an oyster farming application, developed with Bosch, in which data from in-estuary sensors are relayed and integrated into a cloud-based hub that provides weather and environmental data and analysis based on a patented predictive algorithm. This information is presented in real time to farmers in a dashboard format minimising unnecessary shut-downs while providing greater assurances of food safety for consumers.

This is one modest example of how an environmentally threatened industry may achieve sustainability, including for jobs, via the application of innovative 4.0 technologies. Such new practices will enhance the international competitiveness of our horticultural, aquacultural and agricultural businesses to help underwrite Australia's huge potential exports of protein, food products and services to consumer markets worldwide. Increasingly, these consumers will be expecting biosecurity and proof of provenance.

Let me now return to what this all means to our 2030 strategic plan for Australia 2030.

We have focused on five "policy imperatives". Under each of these we are finalising a number of actionable recommendations for the attention of policy makers and participants in our innovation system.

Imperative #1 should be self-evident.

Unless our education and training systems can equip our students and workers to thrive in this new world, we will miss the innovation boat. This does not mean turning out more kids with programming and coding skills; but by 2030 it does mean more teenagers with curiosity, problem solving, and computational capabilities relevant to their digital economy and society. The alarming decline in our student PISA performance in STEM subjects is more than a canary chirp in the mineshaft of the Australian economy it is a clarion shriek for national action. It means support for better teaching, and greater content emphasis on STEM subjects from primary through to vocational and tertiary levels. And it will require a sign-up by society at large that education is a life-long activity, enabling a national embrace of innovation-led competitiveness.

In the context of imperative # 5 we will identify some potential high impact national projects, "national missions", which could assist with the task of building an innovation culture, embracing and harnessing the power of our science, technology and entrepreneurial talent for solving national problems and challenges. These will be national missions which:

- Have a relevant and positive impact on all Australians; and
- Demonstrate the special capability of Australian science and innovation;

- Create new and sustainable jobs; and
- Achieve world attention and leadership

The thinking here is to coalesce a national innovation culture around projects that will provide a step-change in capabilities throughout the innovation system as well as provide significant economic and social benefits for all Australians. Big projects that will inspire Australians of all ages about the possibilities of what can be achieved when we back our scientists and researchers and entrepreneurs working in collaboration.

In conclusion, let me say that I am definitely in the “glass half full camp” when it comes to a view about Australia in 2030. If we tackle the imperatives called out in our Report, build on the hard-earned strengths of our innovation and science, the opportunities will far outweigh the threats from the fourth industrial revolution. I believe we can and should expect Australia to become a top tier innovative nation by 2030.

I anticipate delivery of the ISA Strategic Innovation Plan to Government within the next 3 weeks.

Thank you.