Rise of Digital Technology

Speech to the Australia-Israel Chamber of Commerce (AICC), 12 March 2021

Michael Brennan, Chair

It's a great pleasure to be here with the AICC, and to be in Melbourne – on just my second trip back since March last year – and seeing signs of recovery. In reflecting on what's changed in the last 12 months, it's hard to fully put oneself back in the mindset of February 2020.

In trying to do so I am helped by a document that we put out in that very month - titled *Productivity Insights*[1]. It made no mention of COVID. What it did discuss in great detail was the slowdown in productivity growth in the Australian economy.

It pointed out that average growth in labour productivity since the mid-1970s has been around 1.5 per cent. But in the five years to 2018-19 it was half that; and in 2018-19 it was actually minus 0.2 per cent.

The productivity slowdown is not confined to Australia. It is a developed world phenomenon. And it will surprise you to know that economists don't agree on the causes: whether it be population ageing, increased risk aversion, low investment, widening inequality.

One of the more compelling arguments is that the pace of technological progress has basically slowed down. Which might sound odd because we are so used to hearing the cliché (and modern conceit) that we live in a world of unprecedented rapid change.

But Professor Robert Gordon of Northwestern University has pointed out that what he terms the "Great Inventions" of the late 19th and early 20th century made a bigger difference to the every day lives of people than have the digital technologies of the last three decades.

[1] Productivity Commission, *Productivity Insights 2020: Recent Productivity Trends*, February 2020

He lists things like: electricity, lighting, heating, air conditioning; motorised transport, aviation, the telephone, television, cinema, chemicals, plastics, antibiotics, and clean running water.

In Gordon's words, these inventions:

> *"…had a more profound effect on every aspect of human existence. The digital revolution in contrast, while completely changing office procedures in all industries, had less impact on the everyday life of consumers or on industries involved with physical transformation such as manufacturing, construction, mining, utilities and transportation as well as important industries in the service sector…[2]"*

Australian historian Geoffrey Blainey made a similar observation about technological progress between the 1850s and the First World War. As he describes it, in the space of one lifetime:

> *"Candlelight gave way to kerosene and, in the cities, to electricity...The bullock dray was almost superseded by the steam train, and the sailing ship by the steamship, while the car appeared on the streets and the bicycle was everywhere. A postman reached nearly every corner of the country and the telegram reached every town, while the telephone transformed talk in the cities…[3]"*

As Blainey suggests, in many ways these were more dramatic changes than we have seen in the last few decades. Progress was neither simple nor linear. As Blainey says: "not everyone gained by these changes; some even lost." And, as is always the case with rapid change, there were many unintended consequences.

One such consequence was that the rapid growth unleashed by these inventions used up a lot of resources. And as the economic historian Joel Mokyr points out, productivity growth might have looked much faster in the past, but some of that could be exaggerated when you take account of the full costs:

---

[2] Robert J Gordon, *Declining American economic growth despite ongoing innovation*, Explorations in Economic History, 2018, vol. 69, issue C, 1-12

[3] Geoffrey Blainey, *Black Kettle and Full Moon*, Penguin, 2004

> *"the productivity gains from technological progress in the past may have been overstated because of inputs that were used and never paid for, in large part because there were no property rights and markets for those inputs. Of those, the physical environment was clearly by far the largest[4]."*

We didn't count the impact of emissions from burning coal, or the impact of prescribing practices on antibiotic resistance, or the depletion of whales, bison or Newfoundland cod. As Mokyr points out, Chinese and Indian growth figures do not deduct an amount to reflect the adverse impact on air quality in Delhi or Beijing.

So one aspect of this rapid rise in incomes which transformed life in the western world was a perception – widespread by the late 20th century – that there was a direct trade-off between economic growth and the natural environment. Whereas today that is much less clear.

With the growth of the service sector and the rise of digital technologies we are seeing, in much of the developed world, some decoupling of economic growth and resource use. This decoupling is in its early days and is patchy across ecological indicators, but it is potentially transformative.

Writer Andrew McAfee invites us to think of all the things that we have effectively replaced with a smartphone[5]. Here's my list: a stereo, alarm clock, camera, maybe an additional TV, a torch, newspapers, magazines, a street directory and the encyclopedias which sat on a bookshelf. Maybe one day the home phone. That's a lot of materials. A lot of resources saved.

The transformation associated with the smart phone is partly the new things it makes possible – like ordering an uber – but partly the old things it makes easier and a lot less resource intensive.

In manufacturing and logistics, there is the concept of a product's value to weight ratio. The smart phone has a much higher value to weight ratio than

[4] Joel Mokyr, *The Past and the Future of Innovation: some lessons from Economic History*, 2017

[5] Andrew McAfee, *More from less : the surprising story of how were learning to prosper using fewer resources and what happens next*. [S.l.] ISBN 978-1982103576. OCLC 1085159635 (2019).

all those things it replaced. And when you think about services – including digitally enabled ones – they are weightless, so the ratio approaches infinity.

And that accounts for more and more of the value being exchanged in the modern economy. Hence the possibility that continued growth – even rapid growth – can leave a much lighter footprint on the planet. It's still early days and the evidence of this decoupling is patchy across ecological indicators.

The latest State of the Environment report (2016) shows that energy usage and greenhouse gas emissions are falling relative to real GDP[6].

Our recent draft report on national water reform found that average household water use has fallen from 280 kilolitres in 2000 to about 190 kilolitres in 2019[7]. The real value of irrigated agricultural production has risen over the last decade, even in dry years when water consumption has fallen. That is a result of technology and some public policy innovation in the form of water trading. Meanwhile, increased environmental flows have led to improved native vegetation and wetland condition and protection of biodiversity.

So I am highly optimistic about the ability of technology and innovation to drive higher productivity in a service dominated economy, and cautiously optimistic that this can be done with a lot less strain on the natural environment.

The good news is that there is reason to believe that COVID brought forward the adoption of technologies,

- Infrastructure Australia reports that 9 out of 10 Australian firms adopted new technology during the pandemic including collaboration tools and cyber security[8].
- In NSW between March and May, 80,000 non-admitted hospital services were provided via videoconferencing[9]

[6] *State of the Environment 2016,* Commonwealth of Australia

[7] Productivity Commission, *National Water Reform*, Draft Report March 2021

[8] Infrastructure Australia 2020, *Infrastructure beyond COVID-19*

[9] Sutherland et al 2020, *Impact of COVID-19 on healthcare activity in NSW*, Australia, Public Health Research and Practice, Sax Institute, December

- In a survey, 53 per cent of respondents said they would make use of telehealth services after COVID[10].
- Revenue from online education is estimated to increase substantially from this year onwards[11].

The challenge is to not only hold onto these gains, but to use them to kick-start an ongoing process further innovation. For example, digital health and education services could become so much more than just a zoom version of the physical service.

I will discuss two instances where technology could open up new opportunities: remote working and regtech.

Working from home is not new. It's actually very old. Go back 250 years and most people worked from home – whether in agriculture or as weavers, blacksmiths or other skilled artisans. It was the rise of the factory system in the 19th century that brought people together in a central location, such that by 1914 the majority of the labour force worked away from their homes.

There were strong economic forces that brought about the factory and later, office system: large physical capital and the knowledge sharing that colocation makes possible.

Workers gained enormously in higher incomes (though this took time), but they arguably lost some flexibility in determining their hours of work, and their ability to combine work with household duties (like child rearing).

Nevertheless for most of the 20th century, the logic of bringing employees to a centralised workplace got stronger, because those key inventions – the car and bus, electric trains, aviation, and that other much neglected form of mass transit, the elevator – made it ever easier and cheaper to move people around.

Then, in the last few decades, we hit technological limits. Transport stopped getting faster; and, again, we have had to confront the emerging cost that we never accurately priced: congestion. The cost of moving people stopped

[10] Infrastructure Australia 2020, *Infrastructure beyond COVID-19*

[11] Infrastructure Australia 2020, *Infrastructure beyond COVID-19*

falling, while the cost of moving information fell spectacularly via the computers, the internet and mobile telephony.

That said, until now, patterns of remote working did not shift much. Based on the specific tasks that form part of different occupations, we estimate that around 40 per cent of jobs could be done remotely. But prior to 2020, census data suggests that only about 5 per cent of workers actually worked from home.

Why? Because prior to 2020 there was uncertainty among both firms and workers as to whether large scale working from home was really feasible. And it would have been costly for most firms to try it on any sort of scale. But COVID forced a mass experiment in remote working. And we learned something.

Admittedly survey evidence based on 2020 is imperfect and you have to take it with a grain of salt. But it appears that on average, workers and firms found the experience worked better than they had expected.

- A survey of workers in NSW showed around 53 per cent reported being more productive when working from home[12].
- A US survey found 61 per cent of workers reporting higher productivity and 13 per cent reporting lower productivity at home[13].
- Another Australian survey found 71 per cent of respondents saying they would like to work from home more often in the future[14].
- the same survey found that 70 per cent of managers felt their employees were at least as productive working from home.

This is not to say that remote working is for everyone. Employees will need to work out the right trade-off between reducing commuting time, the flexibility of working from home and the loss of social interaction in the workplace.

[12] NSW Innovation and Productivity Council 2020, *NSW Remote Working Insights: Our Experience during COVID-19 and What it Means for the Future of Work*, NSW Innovation and Productivity Council Research Paper, Sydney.

[13] Barrero, J.M., Bloom, N. and Davis, S.J. 2020, *Why Working From Home Will Stick,* University of Chicago, Becker Friedman Institute for Economics Working Paper, no. 2020–174.

[14] Beck, M.J. and Hensher, D.A. 2020, *Insights into the impact of COVID-19 on household travel and activities in Australia–The early days of easing restriction*', Elsevier, Transport policy, vol. 99, pp. 95–119.

Firms will need to think about the productivity impact, the potential loss of creativity and culture if people are apart; the potential savings on office space vs. the need for other investments in technology and the skills required to manage work remotely. But the likelihood of going back to pre-existing levels of remote working is, well, remote.

If more people work from home more often, the impact on measured GDP per capita is unclear. It could even fall. But the impact on wellbeing could be very significant, through time savings from the avoided commute and greater flexibility (neither of which is measured by GDP).

But this only became possible because of what we learned in 2020. We found ourselves in a situation where we had to learn new ways of doing things and we stand to reap some benefits into the future.

Again, the challenge is to make this an ongoing, dynamic process rather than a one-off: constantly learning and getting better at working in multiple locations, investing in the technology, creating great physical workplaces and finding new ways to foster creativity and collaboration.

Another area where we could use technology to do things better is regulation, where we see real opportunities in 'regtech' – the use of technology to improve the quality of regulation and to reduce compliance costs for business.

Regulation is often necessary – to protect against harms and buttress confidence in various markets. What matters is that it is well designed, enforced in a targeted and proportionate way; that it imposes the minimum necessary costs on businesses and individuals and is reviewed.

Technology can make a difference to how costly and time consuming it is to comply with them. One of the challenges with regtech is how to expand it beyond areas like tax and financial services, which are relatively data rich, into other areas of regulation.

We see four areas where regtech could be highly beneficial[15]. One is where the regulatory environment is particularly complex, or where there are

[15] The examples which follow come are summarised and cited in Productivity Commission, *Regulatory Technology*, Information Paper, October 2020.

numerous regulatory requirements relating to a single activity (like starting a business).

Another is where technology could allow regulators to take a more risk-based approach aided by data analytics. This is already being done by the ATO to detect possible reporting errors by taxpayers and by AUSTRAC to detect financial crime and sophisticated fraud.

In many cases, technology can improve the monitoring of activity, in ways that help both the regulator and the regulated entity. The EPA in Victoria has made use of drones to track illegal dumping. The Murray Darling Basin Authority has trialled satellite imagery to measure and track water resources and their use.

In many cases the data collected is a wider public good. One of the success stories of 2020 is the way the ABS used Single Touch Payroll data from the ATO to report timely statistics on employment and wages across the economy – by sector, by age, by gender and state: giving vital insights to policy makers and the public as the pandemic unfolded.

Australia is regarded as a highly prospective market for regtech, given our stable and sophisticated regulatory systems. We are already home to a number of regtech providers. To succeed, we need strong technical skills within our regulators, and often a preparedness to take a pro-active role in standard setting and coordination of an industry wide solution, as the ATO did with its standard business reporting program.

It might also require regulators to cut across traditional silos – something that has proven incredibly hard for the public sector in general – to share intelligence and have a more joined up approach to regulating individual businesses.

The case of regtech reminds us that the public sector can be an important enabler of economic growth – not by running businesses or picking winners – but by doing its core business well.

Enforceable property rights, prudential regulation, the limited liability company, credible monetary policy – these and other public goods have been the silent partner of technological progress in driving growth and higher living standards. They too are ‘weightless’ innovations that support

growth. As Nick Greiner's review of regulation in NSW showed, good regulatory institutions are best seen as an asset[16]. Bringing 21st century technology into our regulatory systems is just good stewardship.

So there are some grounds for cautious optimism. The pandemic has accelerated the adoption of technology.

It has also highlighted that, if anything, our institutions, our public sector and our social cohesion are stronger than many may have thought.

The question is where to from here? Do we go back to 2019, just with a bit more working from home? Or do we use the disruption of COVID to put ourselves on a different path – one of experimentation, risk taking and ongoing technological adoption.

If we can do the latter, then that would be 2020's great silver lining.

[16] Greiner *et al,* Independent Review of the NSW Regulatory Policy Framework, February 2018