CEDA's Top 10 Speeches
Disruption and innovation 2011–2016

A collection of speeches on
disruption and innovation highlighting
the pace of change

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About CEDA

CEDA – the Committee for Economic Development of Australia – is a national, independent, member-based organisation providing thought leadership and policy perspectives on the economic and social issues affecting Australia.

We achieve this through a rigorous and evidence-based research agenda, and forums and events that deliver lively debate and critical perspectives.

CEDA's membership includes 750 of Australia's leading businesses and organisations, and leaders from a wide cross-section of industries and academia. It allows us to reach major decision makers across the private and public sectors.

CEDA is an independent not-for-profit organisation, founded in 1960 by leading Australian economist Sir Douglas Copland. Our funding comes from membership fees, events and sponsorship.

Contents

Introduction
Professor the Hon. Stephen Martin
Chief Executive, CEDA

The fourth industrial revolution is well underway and the speed of change is only likely to increase.

CEDA has been focused on the issue of disruption and innovation, both through discussion on the CEDA stage and research including our 2015 report *Australia's future workforce?* which examined the probability of jobs today disappearing in the next 10 to 15 years due to technological advancement.

This collection of speeches provides a sample of the wide lens that we need to view disruption through from specific technologies, to the skills we teach, to how company boards need to change their appetite for risk to harness the benefits of innovation.

Examining this issue over five years has also highlighted how rapidly change is occurring, and reflecting back over this period gives us a taste of how quickly things are likely to change over the next decade.

It is easy to forget the massive changes that have occurred even in the last decade. The first iPhone was only released in 2007 and the first iPad in 2010, and yet it is almost unimaginable operating in daily life without this type of technology.

Like previous industrial revolutions, jobs and businesses will be displaced and it is likely we will see a broader range of occupations and skill levels impacted. However, disruption also brings with it huge opportunities and our ability to innovate will ensure we can harness and leverage those opportunities.

Australia is well placed to capitalise on the change occurring but we must ensure we remain focused on the transformation occurring and embrace change.

I hope you enjoy reflecting on these speeches and the enormous changes that have occurred even in the last five years, and the enormous opportunities ahead of us.

Making the most out of the connected present

Mark Pesce

Inventor, author, educator and broadcaster.

This speech looks at the connected sharing brought to individuals and businesses from being part of a technologically-driven world. It describes this sharing network as a capability amplifier, one that lets novices connect with experts, and experts to connect with other experts to reach greater levels of knowledge than they would have been able to gain independently.

Speaker Mark Pesce considers what will happen "in the next billion seconds", the time spanning from 1995 to 2026, in key areas of the economy that are heavily influenced by digital disruption: health, education, local government and retailing.

The speech posits that businesses of the 21st century have to embrace sharing; they have to enhance their learning and they have to empower themselves in their success.

I was taking a taxi over here this morning and I drove on a little connector that goes over Darling Harbour, and I drove right by the IMAX Theatre – you all know it; it's kind of hard to ignore – and it reminded me that it was exactly 14 years ago this week that I made my first trip to Sydney and I was here speaking at a conference titled Internet World. And I had some friends here in Sydney, so I called them up and said "Let's get together". My friend said, "Okay, let's meet in front of the IMAX Theatre; you're staying over in Darling Harbour. We'll meet at 6.30 on Friday night and I'll get some friends and we'll all go out and we'll drink and we'll dance," and so on.

So, at the appointed time I'm there, I'm waiting, and it's 6.30, and half of my friends are there and I'm sitting there thinking we're screwed, because where's the other half of our friends? What are we going to do? Either we go off and they'll never find us or we just wait here and who knows what's going on? And I'm sitting here posing this conundrum and then one of my friends pulls a mobile phone out of his pocket, calls the rest of our friends, and we made plans to carry on.

Now, that's something we don't even think about today; it is something that's completely natural. But at that moment in my life, coming from the archaic society of the United States of America where we didn't use mobile phones very much in 1997, this was a completely revolutionary moment. That moment touched off an entire line of thought that 14 years later is starting to coalesce into a book I'm working on called *The Next Billion Seconds*. This really represents the last seven years of my own thinking about how revolutionary communication has become to us. So, what I'd like to do for the next half an hour is talk through some of the stuff that's going into my book.

The first thing to think about is that in 2010 Australian's spent $1.8 billion on telecommunications. That is a 27 per cent increase year over year from 2009. Smartphone sales increased by 66 per cent and two out of three handsets sold in Australia are now Smartphones. Somewhere in the next couple of weeks 50 per cent of all Australians will own a Smartphone. We are the first nation in the world to reach that level of penetration. So, we are the first Smartphone nation. For the last decade, roughly two per cent of *global* gross domestic product (GDP) has gone into telecommunications. This continuing strong investment has resulted in a completely connected world. Over the span of a single decade we went from half the planet never having made a phone call, to half the planet owning their own mobile. Of the seven billion of us alive in 2011, around 5.5 billion people have a mobile phone. And by 2016, if current trends hold true, every single person on the planet will own their own mobile phone.

Now, I got to do a little survey myself when I taught a class at Sydney University two weeks ago. And I asked the kids in the class, who were all about 20 years old, "How old were you when you got your first mobile phone?" Most of them between sort of 11 and 13 years old. It averaged out that at 11½ the kids got their first mobile phone. And I shared this result with some folks who are parents and they said, "That seems a little old." And of course it seems a little old because I'm looking eight years into the past; these are 20 year olds talking about getting a phone back in 2003, whereas today a child gets their first phone at say, eight or nine years old, and steadily dropping.

The reason that that age is dropping is because it's becoming more useful. As we start to engineer the phone so that it makes more sense to a child, who still has undeveloped cognitive skills, it will follow them younger and younger because the parent wants the tether that it creates between the child and the parent. If you think about it, we already use this almost from the time children are born because we have these wireless devices that we stick in the child's bedroom so we can listen to them as they fuss in their cots. Now, that's actually becoming more and more a mobile device. And mark my words, before very long, as soon as a child pops out of the womb, when the nurse puts the ID tag on that child's leg, it's going to have a mobile inside it that is going to be sitting there monitoring the child. Is it breathing? Is it warm? Is it happy? Is it fussing? And so, mobiles will become a consistent feature of our lives.

I called my book *The Next Billion Seconds* because I wanted to look at the billion seconds between 1995 and 2026; a billion seconds is around 31 years. This is going to be as revolutionary as any period inside of human history because before 1995 none of us were connected. By 2026, which is again nothing, 15 years from now, 2026, being connected will be synonymous with being human. Now, what does that mean? It means that at the press of 10 digits I can get all the assistance that I need: I can get a family member, I can get a friend, I can get a co-worker, if I need to I can get a doctor or a lawyer at-hand right now. If I'm a child I simply know that I can call mum to have her pick me up after soccer practice, or if anything else goes wrong at all I can simply call and get the help that I need and that help is always available.

Now, psychologist Sherry Turkle, who's done more work with children and computers than any other person in the world, believes that this constant close connectivity keeps the child from challenging their own boundaries because no matter what goes wrong they know that they can always press some buttons and go back to mum and get the help they need to get them out of the stick that they're in. It amplifies, artificially, the helplessness between the parent and child. Except it's not just kids who are having their

helplessness amplified by a mobile. Case in point: Hikers who are lost in the bush used to try to find their own way out. Now what do they do? They call State Emergency Services (SES). And so, the emergency services are now getting overloaded with hikers who are no longer thrown to their own devices because they have a device in-hand.

We have always used our connections to help ourselves, but now that we're connected to everyone, everywhere, all the time, we all have access to an essentially infinite reservoir of help, and that means that we're becoming less reliant on ourselves and a little bit more reliant on one another. That's actually a good thing, because relying on one another is the next stage in relying on ourselves. People who learn to rely on one another wisely are the people who are going to prosper in the next generations. And so, all our success as individuals depends on the strengths of the networks that we amass, and that means that the race is on to assemble new versions of the old boys' network. Everyone's looking for connections that are more powerful than their peers' and more powerful than their competitors'.

With so much hanging in the balance, we look for every opportunity to connect to the people who are important, who are influential – people who are knowledgeable. And when we start to do that, we start to put paid to the organisational chart, because when we connect we're going to connect to the people that we see as being of best advantage to us; not to the people who are at our level in the hierarchy, not to the people that we're told to point to. And so, the organisational chart of the 21st century looks like a hairball; there's no up and down, there's no here and there, there's no inside or outside, because people are simply connecting to their greatest advantage at every moment.

Every silo dissolves as it encounters people with all of this connectivity. So, customer relationships no longer enter the organisation at a single well-defined point; they spread themselves around wherever they want to, wherever they deem appropriate, wherever they can find help. Empowered employees go directly to the point in the organisation that gives them the help they need. They no longer go through channels, and that means that all protocols, all bureaucracy and all red tape that was established to regularise relationships has lost its power to compel our own actions. And that's just the beginning.

To connect is to share. When people come together they communicate about things that they find important. Just as a five-year-old might blabber for hours when asked to share the details of her day, when we first connect we share very indiscriminately, offering up anything that we find interesting to anyone we think might be interested. I want you to consider the number of bad jokes

or cute kittens or chain letters that you might have received over the years or maybe you've even sent a few. We begin sharing very, very broadly, but as we do that the people we're sharing with will tell us what they like and what they don't like about what we're sharing and they'll reinforce behaviour or they'll discourage it, and so as we share we become more precise, we become more refined, we become more focused and we focus on the things that we know will have sharing importance with other people.

As we share, other people are sharing with us. Our multiplying connections are now the conduits for that sharing. Every time someone shares something with us we reinforce a bond, and many of our bonds today are predicated on the fact that we're constantly sharing things with one another. That means that we're forming these networks within networks. Networks of interest where people are feeding each other's passions by sharing with one another what they know.

Now, this means that we don't actually have to go out and look for news about things that interest us – news comes and finds us because of our connections. Something that's interesting need only enter our network of connections at a single point and someone will go: "Wait, that's interesting. I'm going to share that," and it finds its way to you. Not one time, not twice, but many times. So, every point within these sharing networks act as eyes and ears for the entire network, and anything that gets known by one point is almost immediately known by all of them, and that means that every one of us, inside of our sharing networks, carries a capacity for situational awareness which would make us the envy of the Australian Security Intelligence Organisation (ASIO).

We can know so much and we can do it so effortlessly. All we need to do is focus our attention on what we're interested in and then connect into the sharing networks, and then once that happens they start to provide us with a continual real-time flow of information. To be interested in something holds within it the potential to become very well-informed.

That means that a well-connected employee embedded within a sharing network probably has broader situational awareness of the firm than the managers do, with their highly formal-connected relationships. Power shifts directly toward the well-connected because to be well-connected is to be well-informed.

Now, your customers, who also share an interest in you, they're out there spontaneously forming their own sharing networks and the topics of those networks is you. And everything that you do well is shared with everyone who's going to care about the fact that you're doing it well. On the other hand,

every one of your failures – for example, say you're Qantas and an engine drops off one of your planes in Indonesia, and all of a sudden Twitter knows about this for two full hours before you decide that you might want to make a statement, which is probably not the right thing to do because the entire network is very well aware of what's going on.

Or to give you another example, I have a friend who was caught in the Top End with an American Express card that had suddenly had its limit cut in half so she could no longer use it, and she was planning on using it for her business trip. After she learned this from American Express she went onto Twitter and over the course of a Friday evening managed to destroy American Express' reputation over a series of very angry Tweets. And she's a very well-connected person, so those Tweets made their way all across Australia. So, everything you do is shared with everyone who cares, whether that's customer service or product design or management, and it instantly becomes a topic of discussion.

What this means is that over the last few years, marketing and messaging and public relations have grown increasingly problematic. You do not control your message. You don't control the formation of those sharing networks, and those sharing networks are creating the message now. Sharing networks will incorporate your messaging only if it proves valuable to them. Everything else you provide is going to be ignored. People will tend to self-select the things that are approved by their own networks and ignore everything else.

Now, the immediate result of that is that businesses need to work to foster sharing networks in which they participate as peers. The business no longer gets to shape the dialogue but it can and it must participate in the conversation; in all conversations about it everywhere. Some of those conversations are going to be resistant to the affections of the business but that doesn't mean that the business will be ignorant of the content of those conversations because if the business situates itself within sharing networks someone else will be across both those networks and will let you know what's going on out of sight.

Sharing is an intimate act. There is an unstated sense that when I share I am being honest with you. If I'm exposed as a deliberate liar I'm going to be shunned by my peers. And this means authenticity – which is a word we will hear a lot about in the 21st century, so let me be among the first to start to flog what will soon be a dead horse. Authenticity is the most important quality that you can bring as a business to a sharing network. You can be wrong as long as you own your mistakes. You can be rude if you apologise. You can be bland, you can be anything else so long as you are not actually false. Sharing

networks are human networks, so there's no place for a brand inside of them; there's only a place for people.

Now, when harnessed, sharing networks give organisations an enormously amplified awareness of its role in the lives of its customers, and although businesses lose the ability to blanket the market with a single message, it's now possible for a business to understand how its customers feel both in aggregate and as individuals at a level never before possible. So we've swapped basically a cavemen's club of marketing for the scalpel; a scalpel that requires precision and practice to use. Fortunately, we will be able to rely on the sharing networks to tell us when we're getting that sharing right.

I want to switch gears for just a minute and mention the curious case of David Cecil, who is a 25-year-old unemployed truckie from Cowra. Because he was unemployed and had plenty of time on his hands, he dedicated himself to learning a new trade. He went online for 20 hours a day, he connected with people who shared his interests, and one of the things that he asked them was: "Who can you connect me to so that I can learn more?"

In just a few months' time Cecil went from just a neophyte to a prodigiously talented human being. This is a dash towards self-improvement that we can all praise, in theory, not so much in practice. Because on the morning of 27 July, the Australian Federal Police raided Cecil's home and they arrested him on, I think, 58 different counts of penetration and subversion of computers belonging to Platform Networks. Platform Networks is an internet service provider out in Cowra and a prospective supplier of National Broadband Network Services. Now, Cecil represents the shadow side of a new, common capability because our sharing networks not only provide us with situational awareness; they also offer us the opportunity to become expert in whatever we find interesting.

Within a sharing network information is freely available; it is embodied by people who have reservoirs of knowledge and experience. Think about it: If I actually knew what was inside every one of your heads right now, if we all could take advantage of everything that all of us knew, all of our years of experience, we would have an amazing base of knowledge and experience to be able to work from. And sharing networks connect experts in unexpected ways. Even the most expert will learn something when they're connected in a sharing network. And those who lack expertise will find the resources they need in order to become experts themselves. We become smarter, we become more capable the longer we remain inside of a sharing network; it's almost impossible to avoid learning something.

So, sharing networks are learning networks. The longer we remain in the sharing network the more we learn. The more we learn the more capable we become, and as we become more capable we come to rely on these sharing and learning networks as the wellspring for our capacity. We become dependent on these sharing networks to support us in our endeavours. There's nothing new and there's nothing surprising about this; we have always relied upon our networks and connections to back us up. But those networks were once bound by blood and by proximity and now they're global in scale and they're instantaneous. Not only is it possible to connect to the domain expert in any area you might imagine, it's easy to do so now. And so, with that kind of expertise available to us all the time we are lifting our game.

We might not, as individuals, ever have quite the same expertise, but over time we grow into experts and we are backed-up by a network of experts who are sharing their own kernels of wisdom. And so everyone within a sharing and learning network moves toward greater expertise. Experts learn from experts, beginners learn from everyone. The sharing network is a capability amplifier. If you don't remember anything else out of my talk today, please take that away. A sharing network is a capability amplifier. It takes everyone, without regard to their initial skills, and dramatically improves their ability to perform. And that's not something you have to engineer into a sharing network; it just happens because people have an innate desire to share, and through that sharing they will learn from one another.

So, we're now starting to find ourselves with radical new capabilities that you wouldn't necessarily be able to discern by looking at someone's CV. Our professional focus has been sped-up in the capability amplifier of the sharing network. Experts are growing more expert and so is the public at large. If I am sufficiently interested in something I can move rapidly into becoming an expert whether or not I consider myself to be a professional. Now, that transition is never effortless, it obviously requires passion. It requires dedication to become an expert. But it is possible, on such a vast scale, and with such speed as has never before been possible. So, we're all becoming experts. And as we put that expertise to work we transform businesses, organisations, institutions and all of our relationships.

Now, in four segments to the Australian economy – health, education, local government and retailing – they're already feeling the impacts of all of this connectivity, and in each case we find that it's a well-informed public that's becoming increasingly expert, and that expertise represents both a threat to the continued smooth operation of these institutions, as well as an opportunity to radically amplify their effectiveness.

MARK PESCE

When people are more empowered than the institutions that purport to serve them, chaos results. So, in reaction to that institutions themselves, businesses, are beginning to harness this connectivity to become vastly more capable and vastly better able to meet the needs of their stakeholders.

I recently concluded a consultancy with the Victorian Department of Health, and in it we were tackling one of the dilemmas that's facing health services everywhere throughout Australia and throughout the developed world, which is a rapidly ageing population and current staffing levels. Health services are going to gradually be inundated; they're going to be overwhelmed by the needs of a retiring boomer generation, and there's no political will anywhere in the world to increase the health services spend to two or threefold to the level that's going to be needed to deal with an ageing population and deliver them an adequate level of healthcare with the system as we have now.

But hyperconnectivity provides a solution to that. The aged, and the carers for the aged, connected by Smartphones, connected by high-speed wireless networks, carry in their hands the tools that they need to maintain close communication with healthcare providers, and they can do this without crowding into a GP's surgery. They can connect to a nurse practitioner who can talk to them on the phone or watch them on the video, or perhaps watch a video that a carer uploaded. You know, "Dad doesn't look right today so I sent you a video. Could you take a look at it?" And the nurse practitioner and the carer work together to extend the idea of medical care and the doctor's office into every home throughout the nation. This is what we call Carer Connect. And it requires practically no infrastructure. The carers would have to have Smartphones, but they mostly do. And the cost savings would begin immediately because it cuts the number of doctors' visits down because patients can be assessed before they have to come in. It cuts the number of hospitalisations down because you can nip the problems before they require a hospitalisation. And it pays for itself from day one.

A small trial was carried out in Tasmania a few years ago involving patients with Congestive Obstructive Pulmonary Disease, which is end-stage emphysema. It turned out that if you have a nurse call in once a day and they listen to the person's breathing they can know whether that person has to go see the doctor or go to the hospital. You give them a better quality of life, you cut the hospital visits in half, and it's all very easy and very easily done.

Now, again in Victoria, I've been working with the Department of Education and Early Childhood Development to develop a strategy that leverages the confluence of three events that are happening simultaneously. First is the Federal Government's Laptops in Schools Program; the second is the National

Curriculum, which mandates that students throughout Australia are doing the same subjects at the same time; and the National Broadband Network (NBN). Now, as everyone – and particularly schools – gets connected to the NBN the nation gains a peerless platform for building and sharing networks. And this, by itself, is enough reason for spending any amount of money on the NBN, because the capability amplifier that it creates hyper-powers the economy.

But the question we were trying to answer was: "How do we encourage the formation of knowledge and sharing networks among professional educators?" Now, we knew that the National Curriculum would be able to form a backbone for these networks because the National Curriculum provides a step-by-step program to be able to guide teachers and students into sharing, so that if a student or a teacher wants to learn or to share about something in particular – that might be calculus or Mandarin or the Eureka Stockade – the National Curriculum provides an organising structure to connect those who want to share with those who want to learn. It becomes a switchboard.

A few weeks ago I was judge at Start-up Weekend Sydney, and technology entrepreneurs from Sydney came and pitched ideas and then spent 48 hours basically sleepless bringing the ideas to life. The winning idea was a project called Classmate. Classmate is a service that allows teachers in Australia to share their class notes with other teachers anywhere. Classmate creates a sharing and a learning network where teachers can take advantage of the expertise of their peers, and it uses the National Curriculum as the taxonomy, as the structure, which helps teachers find a particular lesson plan quickly. So, that's sort of the first fruit of a marriage between education and sharing networks. But there is going to be a lot more to come there.

In an ongoing consultancy with the City of Sydney we've extended the idea of the Connected City, which is one of the three pillars of the Sustainable Sydney 2030 Plan. And their idea of a connected city, when we walked in, was better public transport and better bicycle paths between the various areas in the city. But potentially the city is a huge sharing network composed of the knowledge of its residents. Each of these residents has valuable experience and valuable knowledge about the city; that knowledge is normally hidden from view as it is in this room. But city residents are already building their own sharing networks; they're already doing this, and they're doing it in order to make themselves more effective in this city. The Connected City needs to take an active role in the identification and promotion of these networks, and where these networks don't exist, provide the kick-offs to help them grow. Connected City residents use sharing to figure out how to make the city work better for them, and that means that the city is relieved of providing those resources itself because the residents are assisting one another.

MARK PESCE

It's as simple as understanding: "How I can learn who in my neighbourhood who has already filed a development application so I can get some help with this?" Or, "If I have filed one, how can I share what I learned about dealing with the city bureaucracy?" And it's the core of an idea of a connected city and it turns every neighbourhood and every suburb into a sharing and learning network.

Australia's retailers are doing it tough. Years of under-investment in e-Commerce has left them prey to a strong dollar and increasingly bargain conscious consumers who are now painfully aware of the tariff they pay for buying Australian. So they're scrambling online. But when they scramble online the retailers find themselves outclassed by the foreign competitors. This is because they're fighting the battle on the wrong playing field. Instead of being the Amazons and the eBay's of the world, Australian retailers need to leapfrog from bricks and mortar into mobile commerce or e-Commerce. They need to start to use the mobile as the foundation of a new continuous relationship with the customer, a customer who now always has a catalogue in-hand, who will always have a connection to a personal shopping assistant, who will always have the best service because service for people who are time-poor trumps the cost-savings of ordering online. And so what you have is a marriage between the virtual and the real, and that marriage is a place where retailers fight, not by abandoning the real world but by multiplying the real world with the pervasive connectivity of the mobile.

Now, connecting the real world and the virtual world was impossible before the Smartphone because you couldn't carry your laptop around with you everywhere. But now retailers have the capability to marry the two and they can foster a kind of customer relationship that was never before possible, because a customer isn't just someone who wanders into your shop; they're looking to connect, they want to have a sharing relationship with you around what they need.

So, the next billion seconds are going to see us all become a lot smarter, a lot more effective and a lot more dependent on one another. And despite all of the hubbub about mobiles and networks this is not a technology-led revolution. It's about us, it's about us connecting, it's about sharing what we know, it's about us learning what we want and then putting that to work for us. It's simple but it's profound. Meeting the challenges in a world where we've all grown brighter and more powerful, businesses of the 21st century have to embrace sharing; they have to enhance their learning and they have to empower themselves in their success.

NBN, sectoral transformations and productivity benefits

Andrew Stevens

Chair, Advanced Manufacturing Growth Centre and
Independent Non-Executive Director, MYOB Group
(then Managing Director of IBM Australia and New Zealand)

Andrew Stevens looks at the opportunities that will be opened up to Australian business through the roll out of high-speed, fibre-based broadband. It argues that as technology displaces traditional jobs, Australia's economy will need a highly productive, world-class services sector in order to remain internationally competitive.

Mr Stevens looks at the possibilities opened up to businesses to take a number of existing discrete computing and intelligence systems and integrate them in order to improve services, efficiencies and forecasting. He also warns that while broadband presents huge opportunities, we will only gain from them if individual businesses and agencies recognise the need to reinvent their business models.

At the time of this speech Mr Stevens was the Managing Director of IBM Australia and New Zealand.

I'm pleased to say that IBM has been playing a key role in the National Broadband Network (NBN) by creating the core business and operational systems needed to help build the network, commission customers, and ensure service performance. This is an important program and we're very excited to see the network roll out.

Today I'd like to focus on three things:

• Why fast broadband is critical to our future;

• New research we've completed and its long-term impact on our economy; and

• Why you need to be transforming your business now.

I particularly want to emphasise that while broadband opens up amazing possibilities, it's up to each enterprise to change the way they do business in order to realise those benefits.

Let me start with why broadband and information and communications technologies (ICT) are so important. Australia has had a dream-run over the last few years, but we know the mining boom will not last forever. The mining boom has also been masking weaknesses in our patchwork economy. One of the key issues is that productivity growth has stalled – in fact, it's worse than stalled, it's in decline. I'm sure you've heard and read a lot about that so I don't need to add to that here.

The key to increasing productivity will be to leverage our broadband and computing infrastructure to become efficient and smarter. Let's not forget that Australia's last period of strong productivity growth was in the 1990s, when we had the personal computer revolution and major leaps in telecommunications – this was recently noted in a discussion paper by the Reserve Bank.

The other thing that's important to keep in mind here is that the resources sector directly accounts for only 10 per cent of our gross domestic product (GDP). The majority, some 70 per cent or so, lies in services and in the knowledge-based industries. So the challenge boils down to this: If we want to remain internationally competitive and relatively rich, then we need a highly productive, world-class services sector.

If we are world-class we'll be able to make use of the power of broadband and technology to reach out into global markets and win. If we're not world-class then we risk the rest of the world using that same technology to reach into our markets, like we're already seeing with some online retail today, for example.

To get a clearer sense of where we're headed, IBM has worked with IBISWorld to produce a major report called *A snapshot of Australia's digital future to 2050*. This report was released in June and full copies can be downloaded from our website. This was the first report in the world, as far as we can tell, to look at every industry sector in the country and consider how it will be impacted by ubiquitous high-speed broadband. As the title suggests, it looks at the period from now until 2050; the next 40 years.

We found some interesting things. There will certainly be a lot of change, but of the 509 industry classes that make up the Australian economy, only 15 are likely to be completely displaced by digital. Those are industries like book and magazine wholesaling; newspaper publishing; radio and free-to-air television broadcasting; and the processing of photographic film. Every other sector stands to gain from digital. By 2050 Australia's GDP should be $5.3 trillion in today's terms, compared to our current $1.5 trillion economy. Broadband will be central to the generation of $1.25 trillion of that $5.3 trillion – that's one fifth of our future economy.

It will provide a transformative benefit for 23 per cent of the economy. Put another way, by 2050 a quarter of our economy won't function without broadband. The report found that an additional 23 per cent will see significant benefits from broadband. The rest of the economy will also see some gains.

So, by 2050 almost half of our economy will be heavily dependent on broadband. But what's the trick? What's broadband going to do? Broadband is the new utility. What does that mean? If you look at human history you'll see that every major economic era has been underpinned by a new utility – some form of pervasive and transformative tool. In the Agrarian Age, from around 1820 to 1865, we had transport in the form of wheel-carts and roads and the ability to move water. In the Industrial Age, from 1865 to 1965, we had mechanical and then electrical power, water, wheels, steam engines and electricity. Since the 1960s, the new utility has largely been computers and the first generation or two of telecommunication.

With broadband we're now moving into what could be called the Infotronics Age, where the utility is fast communications and very powerful computers and systems. What this latest utility does is reduce our need to move things. We can move bits and bytes instead of ourselves or other physical objects. That's what you are doing when you video-conference your colleagues rather than seeing them in person. It's what you are doing when you shop online rather than in-store and when you buy products directly from a manufacturer rather than through an intermediary. In that sense broadband is a surrogate for transport, and the less physical the movement, the more efficiency we gain in our economy.

Let's look at what this means for some sectors that we modelled in our report. In retail trade the online revolution is going to continue. We certainly are going to see the concept of the High Street and shopping centre continue to be redefined. As an example, we're working with David Jones to create a new multi-channel e-Commerce platform that will enable the company to provide customers with a seamless experience across its physical stores, its online stores and mobile devices. This will mean bringing together web and application development, social media, promotions, analytics and reporting plus backend ordering, inventory management and fulfilment systems. It's a huge change that will underpin the company's future.

In mining we'll see much more use of smart centres and machine-to-machine communication to help drive efficiency and to remove labour costs. Broadband will play a role here by powering logistics. It will also allow companies to perform sophisticated tasks like ore-grading remotely and without people on-site. In education and training, super-fast broadband will allow educators to pursue whole new paradigms, including the virtual delivery of courses. This will open up the Asian and global markets, especially for Australian educators, and open our markets to the world. This is one of those areas where we're going to have to be world-class.

Healthcare and social assistance is poised to become Australia's biggest industry and our largest employer well before 2050. With broadband we'll see more use of ICT-powered diagnostics and partial self-diagnosis, preventive health systems and more efficient operational systems within institutions. These advances will be vital to cope with the costs and demands that will come with the ageing of our population and the growth in chronic health issues.

ANDREW STEVENS

Finally, public administration and safety is the sector that stands to gain the most from broadband in pure dollar terms. This sector includes many non-commercial government activities and safety-related arms of government, such as defence and policing. Fast broadband, analytics and advanced software will give us smarter, faster emergency services. They will make it possible to predict and mitigate the impact of natural disasters and they'll allow us to unlock efficiencies through innovations like online voting.

There is a lot of research focusing on broadband, and we've just added to it and what it's going to do. But when you drill into it, you often find the same conclusions in these studies; it's that same old chestnut. People see broadband as delivering better video, speeding up email and enabling online shopping. It will certainly do these things, but they're not the main gain for business. What we need to focus on is that broadband – especially very high-speed, fibre-based broadband – is the technology that is making it possible to build systems of systems. This is when you take a number of existing discrete systems and integrate them.

This enables you to:

• Increase your intelligence;

• Improve your service;

• Increase your efficiency; and

• Improve your forecasting.

Our industry has been doing that for a long time inside companies, integrating sales, customer relationship management and accounting tools within enterprise resource planning (ERP) systems.

With broadband and today's computers and storage we can do this on a much, much larger scale. We can also drag in information from more devices including sensors, cameras and global positioning systems (GPS), and even social media. We can then analyse that data to gain new insights. There aren't actually many examples of such systems being used in business today. This is the cutting-edge, but it's also where broadband is going to take us.

Let me give you one example that we've been modelling at the IBM Research Lab in Melbourne to give you a sense of what's possible. Let's say there's a hailstorm likely to hit Sydney. It will be possible for an insurer to take information from a weather system to predict when and where the storm will hit, to the accuracy of a square kilometre. The insurer could marry that data with its customer records to work out who was about to be impacted and warn

them. That's two systems. Now, if the insurer could also integrate real-time data from the mobile phone network giving it the location of customers at that exact moment it could go further; it could send a message to those people who live in the zone or those visiting the area alerting them to the potential damage from the approaching storm. A fourth system the insurer could call on is social media. By analysing chatter on Twitter and other networks it could further refine its understanding of the crisis as it unfolds. It could also use those networks to communicate in new ways with all relevant parties.

All of these steps require high levels of connectivity and massive computing power. But this is what's coming, and smart businesses will create new business models to embrace them. Indeed companies like Amazon already make heavy-use of this kind of technology. Amazon is what we would call an insights-driven organisation. All of its systems are built around gaining real-time insights into customers and using these to improve its offering. The benefits of this intelligent approach can be seen in its sales revenue. Amazon's revenue per user has been estimated to be $189 a year compared to eBay's $39. Amazon wouldn't exist today without today's broadband. Imagine where Amazon will be in 40 years.

Another question you see in studies is whether broadband is going to have an impact. I don't think there's any uncertainty about this. Broadband has already changed business in a massive way and it's going to change it a whole lot more. I'd invite you to ask Greg Hywood at Fairfax or Kim Williams at News Corporation whether they think broadband might change their business. Ask yourself. I think the more interesting question is whether we are ready for these changes. Unfortunately, I don't think we're as ready as we should be. We need to transform the way we do business for the broadband and data-driven age. You should do this defensively to keep up with the Amazons of this world, but you should also do it opportunistically because these are the capabilities that are opening the door to future value creation.

Australia is well-placed to take advantage of broadband and technology in general. We also have many companies that are taking advantage of these shifts to ensure their competitiveness, and this isn't just companies at the top end of town.

Let me give you an example of an organisation we're working with, which is transforming its operation in response to those trends. MG Kailis is a West Australian company that specialises in seafood and pearls. To maximise its cash and its profits it's using business analytic software to determine when and where to fish based on the size, grade and species of lobster, prawns and other seafood. This insight helps fishing crews plan their days and seasons

to ensure the best yields for a hard day at sea. MG Kailis also analyses and adapts to fluctuating exchange rates to help determine what prices will net it the most profit. This is just one example of the many business model changes companies are making across Australia. It's a great start, but if we want to remain internationally competitive and lift our productivity we need to be making changes on a massive scale in both business and in government.

To sum up, broadband presents huge opportunities. It will benefit the entire economy, but only if individual businesses and agencies recognise the need to reinvent their business models. We have a new utility; it's getting faster and more widespread. Now it's up to all of us to innovate to make the most of it, and in doing so we will create a new and highly prosperous economic age.

Maximising the digital economy

Ahmed Fahour

Managing Director and Group Chief Executive Officer,
Australia Post

This speech looks at 2008 as a turning point in modern history, where the world welcomed the dawn of a new technological age. Australia Post Managing Director and Group Chief Executive Officer, Ahmed Fahour looks at the rise of social media, Smartphones, and the changing way humans interact with one another and the world in the context of what challenges and opportunities it poses to businesses, the government and consumers.

Mr Fahour looks at this issue from the perspective of Australia Post, detailing how the postal industry has faced challenges with the digitisation of correspondence, while embracing new opportunities with the growth in e-Commerce.

I would like to pose a question to start with: In the future, how will historians reflect on this current decade in Australia's history? What will they write about us? I'm convinced about one thing, that historians in the future will look back at this era and see it as a major inflection point in our society.

There are so many very clear global trends that we are experiencing at this moment, the most obvious is the ageing population in countries of the Organisation for Economic Co-operation and Development (OECD). Climate change is clearly occurring. And there is the rise again of a number of developing nations that are rapidly becoming industrialised, wealthier and urbanised – especially in Asia. But I believe in addition to those points, and probably most significantly, there's the impact of technology and the rise of the digital economy in connecting people across the globe. Just like 200 to 300 years ago we described that era as the Industrial Revolution, I believe that future historians will write about the 21st century as the Technology Revolution, and the invention of the World Wide Web will be credited as the foundation of this transformation that we're seeing today.

The reality is the web was invented 25 years ago. The digital economy that we see in front of us now is the result of that invention. It is really being enabled now through a convergence of innovation. Because what is innovation? Innovation is the commercialisation of invention.

The result of this innovation is that we're seeing:

• Huge investments in very fast broadband services;

• The digitisation of all forms of media and entertainment;

• The growing acceptance of cloud computing;

• Sophisticated advancements in managing and mining data;

• The mass adoption of social media; and

• Easy to use, intuitive mobile devices.

The rise of a digitally-enabled economy is a seismic shift for Australia and for the world. If you're comparing it to historical events you have to go back to the invention of the printing press or the steam engine or electricity. It's one of these monumental advances that changes our behaviour and the capability of human beings.

AHMED FAHOUR

3

At its most basic level it means we are all spending much more time each day looking at an electronic screen. But in a much deeper sense, the rise of digital channels are actually changing our pattern of work, how we relax, and how we connect with each other. When historians in the future look beyond the impact of the Global Financial Crisis (GFC), I think they will really focus on the year 2008 as an inflection point in the growth of the digital economy. That was the year that the first iPhone was released in Australia. Today, just five years later, six out of 10 adult Australians own a Smartphone. And it's already hard to imagine how we coped without it.

These devices have made information and services truly mobile and universally accessible. Interestingly, in India today more people access the internet via a mobile device than through their desktop computer. It was in 2008 that social media became mainstream and a runaway phenomenon worldwide. In 2008 we had just 90 million Facebook accounts. Today, we have over a billion. The growth of Twitter was even faster. In 2008 we would do one million Tweets a day. Today we do 340 million Tweets a day. Twitter is the fastest growing social technology in history. From launch it took only nine months to have 50 million users. Let me compare that to Facebook, which by comparison took a year to get to 50 million users. How long do you think it took TV to have 50 million users? It took 13 years. And radio took 38 years to get to 50 million users. So you can see that from a consumer point, this technology has been rapidly adopted.

So, it does beg the question: "What further change are we going to see over the coming decades as super-fast broadband services are rolled out to the entire country?" The truth is, I don't know. I don't think really anybody knows what it will lead to.

When the printing press was invented we didn't know it would lead to an era of mass-communication and eventually the Scientific Revolution. When the steam engine was invented nobody predicted that it would lead to mass-urbanisation as people moved from Agrarian life to work in industrialised cities. And when electricity was invented nobody could foresee that it would lead to the light bulb, refrigeration, air-conditioning, telecommunication, and thousands of other uses.

Just like those early inventions, technology and the web will continue to transform our world in ways we just don't yet appreciate. Its impact on our social, cultural and commercial norms is staggering and it will continue to change into the future.

So far, most of our public discussion here in Australia about the digital economy has focused on the political debate about the price of broadband infrastructure we should invest in. To me though, investment in broadband infrastructure is fundamental. Nation-building? No question. Whether it's copper, fibre or wireless, we want broadband, and I think all politicians agree. But I believe it's one part of a much bigger picture.

The inventor of the web, Tim Berners-Lee, visited Australia recently and he made a very similar point – and given that he created the web, I think it's worth quoting him. He says, "It's a wonderful thing having everyone connected but it's only a foundation. The fact you have a piece of fibre optic hanging out from the wall (or from the node) is only the start."

I'm certainly more interested in the services and applications that will deliver real benefits in a digitally-enabled economy than the technology itself. How do we use these broadband services to deliver more efficient access to government services? How do we encourage Australian businesses to innovate? How do we help Australian business to get online and compete in the global marketplace? How do we bridge the digital divide so that the elderly, or people in regional rural communities, or those that are disadvantaged, have access to the benefits of the digital economy? These are the issues that are going to produce real outcomes with economic growth, productivity gains and jobs for Australians.

I was interested to read a recent report by Deloitte that estimates that one-third of our economy faces imminent and major digital disruption. For many sectors that disruption has already occurred or it's well underway. If you're in any of these industries I'm sure you understand. The music industry, video stores, retailers generally, the newspaper industry, and many other companies from Kodak to Borders. No industry is untouched. Of course I can speak with quite some authority about the impact of this because Australia Post is both a major beneficiary and a major victim of this digital disruption. For us digital disruption kind of balances out to be a neutral term. On the one hand it gives us enormous opportunities, but on the other hand it's giving us major challenges. Undeniably our biggest challenge is in our traditional core business of mail. For those of you who are unaware, mail is now in decline – not just here in Australia but all over the world.

AHMED FAHOUR

Returning to that year that I mentioned to you earlier: 2008 was not only an inflection point for the digital economy, it was also an inflection point for our mail business at Australia Post. Our mail volume peaked in that year. We were in business for 203 years and our mail volume grew with GDP; if you knew where GDP was, that was the mail volume number. Up until the year 2000 it was almost a perfect correlation between the economy and mail volume.

But in 2000 things started to change. From 2000–2008 Australian mail volumes remained basically flat. But, since 2008, we've lost 20 per cent of our volume in the space of only four years. And worryingly the rate of decline is now accelerating. Comparing 2008 to where we are today, Australians have sent one billion fewer letters than at our 2008 peak of 5.3 billion.

Now, to put that in dollar terms, we've lost $400 million of revenue over that four years; that's 20 per cent of our mail division's revenue. Given this volume and revenue decline, and the fact that we have a community service obligation that we are servicing, it wouldn't be a surprise to many of you – and very cheap stamp prices, I might add – it wouldn't be a surprise to many of you that we lost $190 million in the mail division last year. That loss has been growing since 2009 and it will continue to grow into the future as consumers, businesses and the government shift from physical channels to digital channels.

As a consequence we have seen a reduction in our staff in our mail division, and like our falling profit, this reduction unfortunately is going to continue. Knowing this trend has been going on we launched what we called the Future-Ready change program to help Australia Post adapt to this shift in consumer behaviour that is being driven by the digital world. We redefined our strategy in direct response to this shift. And we started thinking about "What is our core market? What business are we in and how do we want to play into the future?" Our strategic response to the physical decline of mail is that we have launched a series of offerings and products to support our customers, and one of those I'd like to mention is the launch of the MyPost Digital Mailbox.

So, one of our key three strategies was to build a sustainable communications business both physically and digitally. Of course we will continue to deliver physical mail in Australia for many years to come. Letters were our original purpose for being.

Pretty soon we will offer this digital mail service to all Australians free of charge. You'll be able to use it to receive your mail, store your important documents, like bills or statements, and pay bills all online. The best real-world analogy of this is a digital mailbox on your Smartphone that combines your letterbox outside of your house, your filing cabinet where you file these statements, and your payment card or bank account all in one. Wherever you are, you'll get your mail, you'll be able to pay your bills, read your statements and store it all securely in the cloud. It'll be done in a secure environment online but in a private box, which is not using an email address. You will have one password, one username, and you will have a secure digital identity, and it will cost you nothing.

The development of our digital mailbox is consistent with our vision of Australia Post as a place that connects the digital economy with the physical world. We have a proud track record as a trusted intermediary that connects business and government with their customers. The digital mailbox is live and operating today, and in the coming months it will be available to all Australians.

As I mentioned earlier, digital disruption has not only presented some challenges to our traditional business but it has presented to us some vast opportunities, and the most obvious opportunity for Australia Post is in the e-Commerce market. Over the past three years our parcel volumes have grown by around 10 per cent per annum and it's completely driven by online shopping. Seventy per cent of the parcels we deliver today are generated by an online transaction. This generates over a billion dollars of income each year for us. This has enabled us to grow our parcel division both in terms of profitability and jobs. Overall, for the Australia Post group, the growth in the e-Commerce market, combined with careful productivity and cost management, has enabled us to balance our business.

The Australian e-Commerce market was initially slow by international standards but it's now growing rapidly. Three out of four items that are bought online by Australians are purchased on domestic websites. And very interestingly, most of these purchases on Australian websites are from small- and medium-sized businesses who have become the engine room of the domestic e-Commerce market. Many of these businesses that are in the top 10 did not even exist five or 10 years ago. Think of companies like: Catch of the Day, Ozsale, Deals Direct, GraysOnline. They are the pioneers of online e-Commerce. It's incredible to watch the growth of these businesses firsthand. These entrepreneurs saw that technology was fundamentally changing the nature of markets and they capitalised on that opportunity.

Not so long ago our markets were really defined by geographic areas; businesses would locate in the best part of the street. What do they say retail is? It's location, location, location. They would go for the population density and they would then provide their services in those premises. The rise of the digital marketplace supported by effective logistics networks has changed our marketplace entirely. Digital marketplaces are now diffused. So businesses can be located anywhere and still sell to customers everywhere. Obviously that's a threat for some and an opportunity for others.

There are plenty of examples right across the country of small businesses in regional and rural communities that are thriving because of the digital economy. I would love to give some PR to just one of those. It is a small online business and the name of it is Birdsnest. You can look it up www.birdsnest. com.au. Birdsnest sells women's clothing, and they have customers all over Australia, and as a matter of fact they've got some customers all over the world. They started with a physical store and that little business was located in the Snowy Mountains in a little town called Cooma, which I'm sure many of you have heard of. They set up this store, they built an online business and they built it all in Cooma; the website, the operations, the warehouse and the customer service. This little store now has just under 100 people working in Cooma supporting its business and 94 per cent of all of its sales are online. It sells about 5000 items a week online all from Cooma. They use Australia Post as their delivery partner, and what we've become is a significant partner in their ability to sell beyond their town.

Our nationwide logistics network is now underpinning the growth of thousands of small businesses like Birdsnest. We provide them with fast, reliable ways of getting their products to their customers. Their success is our success. That's why we at Australia Post have a vested interest, ironically, in expanding the digital economy, despite what it's doing to our traditional core letters business. But we also acknowledge that some aspects of our parcel network and our logistics network were originally built for a different purpose and a different type of customer. Clearly it was built for letter delivery. So we're starting to invest very heavily in the capacity of our network to handle this increased volume of parcels but we're also investing heavily in the way we deliver and can retrieve those items.

We know that in today's busy lifestyle, gone are the days where dad's at work and mum's at home waiting for the mailman. People don't live their life like that anymore. People are busy and they're everywhere and they're not at home to receive their very important items. People don't mind waiting a few days for a bill but they don't want to wait a minute longer than necessary for their parcel. They want it now because it's a source of joy, it's a source of satisfaction.

We have 4400 stores scattered over the country and we say, "Well, if you're not home, at least take this card to the Post Office and collect it when you can". Some people will say that's frustrating, but that's actually a good starting point. You try picking up a parcel from some of our competitors when you're not home. But the reality is, out of those 4400 Post Offices, the great majority are run by small business owners as licensees or franchisees of our organisation. Because of this, they are open certain hours that are not as convenient as many of us would like them to be.

To address this, one investment that we made and announced last year is the nationwide creation of what we call the Smart Parcels Locker Network. What that means is scattered throughout Australia in 250 sites there will be a bunch of lockers that are available 24 hours, seven days a week. When you buy something online an SMS or an email will be sent to you with a four-digit code number and it'll say, "Here's your nearest locker. Come and pick up your parcel whenever you want; before work, after work, during work, and it'll be where you want it to be". We announced this in the middle of last year; there are 50 that are already open today and there'll be 200 more opened this year and next.

Clearly the digital economy has posed great opportunities but has also had a dramatic impact on the way we run our nationwide network. As we evolve our business into being a parcel company, this will cause some disconnect for many Australians who traditionally see us as a mail business. But the reality is, today, we have more revenue coming from our parcels business than coming from our mail business. And that's quite staggering when you consider that for the past 203 years we have been predominantly a letters company.

We really started to cross the line into becoming a parcel delivery company last year with the full acquisition of StarTrack. This deliberate strategic push was in direct response to the digital economy. We are a business that in 2010 looked like we were going to be wiped out. We're now a business enjoying terrific growth and managing very carefully our traditional mail business. I'm confident our strategy is grounded on the right principles and we have a firm understanding of how our markets are shifting due to the rise of the digital economy.

So, in conclusion, ladies and gentlemen, let me finish with this thought. I believe the challenge for Australia, as a whole, is really to pin down what role we want to play in the globalised digital economy, and to ask if we have what it takes to compete with the rest of the world. If we get these strategic decisions right today, I'm sure historians in the future will reflect on this period as the time when we secured Australia's prosperity for future generations.

AHMED FAHOUR

Clearly consumers have voted. The uptake of technology here today and historically is among the highest in the world. But the real issue that bothers me is that the transformation that government and businesses need to make seems to be going at a slower pace in adapting and adopting the ICT revolution. And it also really bothers me that when you look our investment in ICT as a percentage of GDP, Australia's governments and businesses rank towards the bottom of the OECD. Consumers have voted, but business and government are not yet responding at a pace that I believe we need, as a nation.

Innovation and regulation in the digital age

Professor Jane den Hollander

Vice-Chancellor and President, Deakin University

This speech looks at how digital technologies are transforming the higher education landscape, and questions the role universities will hold in the face of the explosion of Massive Open Online Courses.

In an age where knowledge is free to all on the web, how can employers be assured of the standard of knowledge in potential employees? How will quality be maintained? And will the move to online education assessment benefit the student consumer?

Towards the middle of the last century, a long time ago, the CEO of a top United States university drew up a list of 85 institutions that had survived in recognisable form for 500 years. The Catholic Church was, and remains, the standout. A few Swiss cantons, the parliaments of Iceland, the Isle of Mann and 70 universities. He wondered who would be around for the next 500 years; he thought universities would probably rule the place.

Since then, the world has changed. I'm not sure about those Swiss cantons, but we know there are no universities today unaffected by the tsunami of digital change. Global connectivity, internet analytics, smart machines – particularly new media – and of course the eruption of Massive Open Online Courses (MOOCs) alter every aspect of our business in higher education.

Largely unchanged for centuries, the university sector is now confronted by changes which question the fundamental assumptions underlying our existence. The rate and pace of change means that regulatory frameworks may have difficulty keeping pace. There will not be time for long drawn-out briefs, consultations and then four or five years to implement a new way of teaching the next generation.

The lesson to all of us over the past few years is that the digital economy uses time differently and brutally. But of course for us it was a very slow burn. I like the analogy of a fuse; it was a slow fuse. Earlier this year, three months ago, the internet turned 25. Tim Berners-Lee, a Britt, invented it to send data more conveniently amongst colleagues. At that time I was working in Manchester in the Turing Building and I remember as if it was yesterday getting my first email after shouting to my operator, "Mark, okay, send it now". And we all stood waiting expectantly and then a few moments later: a beautiful thing, our first email. But here we are and what you all know is your lives are now more different than they were then, and this is particularly evident looking back five or two years.

The first big disruptor for us has been MOOCs, and I'm now talking about the higher education sector. MOOCs offer free tuition for all. They have enrolments counted in the millions and they are mostly run by a few of the world's elite institutions. Online education went from the poor relation to cutting-edge in the blink of one year.

What has it exposed? Well, universities no longer have a monopoly on creating or sharing knowledge, everything is on Google. Consumers of information are no longer passive observers but active contributors who co-create knowledge, evolve markets, have opinions and influence governments. Everyone has an opinion and sadly, in some cases, they voice it somewhere.

Just as the Oxford dons in the middle ages had to rethink their role when the invention of the printing press gave easy access to the printed word (they thought they were about to be made redundant by books), today digital technologies have transformed the way education is delivered, supported, accessed, assessed and actually, more importantly, perceived and afforded. You just have to read the newspapers today, for the first time in Australia, universities may be an election issue.

But once again, the academy now is concerned for its future. What can we do in the academy to protect ourselves? If it's all free on Google or in MOOCs, life as we know it is probably over. Who will guard standards and what is quality all about in an online, cloud-based, easily accessible free-world?

So how do you assess the quality of online learning in an age of MOOCs? Is it quality of content, quality of design, of instructional delivery? Ultimately, of course, it's quality of outcomes, which are rarely spoken of. The question I might ask then is: If something is offered for free, is there an obligation for it to be good? Probably, but that is not always our experience in terms of what is delivered and the value afforded it by the consumer.

The big regulator in our higher education sector is the Tertiary Education Quality and Standards Agency (TEQSA), which as of this morning has a new commissioner, Nick Saunders, who is the former Vice-Chancellor of the University of Newcastle. TEQSA has a troubled history. It was set up in 2011 by the government to regulate and assure the quality of Australia's large, diverse and highly lucrative higher education sector. Effectively set-up to protect the brand of Australia in a market that was starting to look threatening.

The impact of digital change is definitely on TEQSA's radar. TEQSA has affirmed the commitment to protect quality but allow innovation, and that's been a strategic move – that they've used the words together. Protect quality, allow innovation and as with all courses, the TEQSA focus in new learning is to see evidence of a sound learning environment. However, the evidence of a firmer sound learning environment when learning takes place in the cloud may differ from place-based learning, but surely the standards remain constant.

I'm constantly amazed that people think there are different standards depending on how you get your information. However, TEQSA only kicks in if whatever that learning content is – be it MOOCs or some online course somewhere – it only kicks in if it contributes to credit towards an Australian degree. TEQSA's regulatory principles will apply when there's a credential which is named in the Australian Qualifications Framework. Never underestimate how powerful and robust the Australian regulatory framework is. We hate it mostly, but we love it when we are challenged internationally.

TEQSA will want to know whether the teaching approach used is relevant to e-Learning. Is there support available to students, especially school leavers straight from school? Mature aged students, will they be able to cope? Is there support staff for introducing an e-Learning curriculum and, of course, the principles around plagiarism, policies and procedures? All of that sounds familiar, 20 years ago we were doing those sorts of things.

This deals with quality issues when Australians provide content and branding for the big MOOCs that operate in EdX and Coursera. Deakin has its own MOOC, we're a university that did one on our own and we are absolutely required to ensure, in that MOOC, that if anyone uses it for credit, to make sure we do not breach the standards.

Steve Jobs had a very interesting take on quality. He said, "People don't know what they want until they see it". And I think that's a very interesting thing to use today from the perspective of regulation and higher education. So what do students expect from their university education? A well-paid job, better understanding of the world, an exciting lifestyle, the opportunity to meet new friends – familiar outcomes to all of you and it has always been the case. The relevant importance of these factors will vary at different career and life stages. The question is, how do you get that in a wholly online or free environment?

What do employers want – there are many in the room. Is it a particular skill-set, ready access to top talent, and professional development tailored to their business needs? Again, a familiar outcome but the big difference and I think the big disruptor for us and our regulator is still coming. Just as iTunes unbundled songs from a CD, the digital revolution is enabling a university degree to be disaggregated into its components: vocational knowledge, generic professional skills, deep discipline knowledge, practical training, evidence of achievement, networking opportunities and student lifestyle experiences. All of these things can be separated into their parts and their opportunities.

PROFESSOR JANE DEN HOLLANDER 4

However, our regulatory framework is developed on an assumption of a three- or four-year degree that's fulltime, where you get on the bus, you go to a campus, you sit in the classroom and then you come home. What will unbundling mean for maintaining quality when different providers are providing different things at different parts of that once monster entity? Surely once you can demonstrate complete competency, time matters little. Why make people hang about and do assessments they no longer need? And in this information age, big data and learning analytics allows us to think very differently about assessments and about success indicators. Course completion rates and retention – and MOOCs do very badly on retention but I'll come back to that – course completion rates can be misleading.

A clear takeaway from the 2013 Massachusetts Institute of Technology (MIT) Harvard review of MOOC retention was a huge variation in how students engage in MOOCs or indeed online education. Some MOOC learners are only interested in a very small part of the learning in the course they do, tailored to their own individual needs, then they'll sign off. They won't bother completing the MOOC and they'll move on to others because their learning outcome has been met.

For the individual this is success, for TEQSA this is disaster. Why didn't they finish the whole 13 weeks? How is retention relevant in this scenario? I'm guilty, I think I've done about seven MOOCs. I did one to the end, Architecture in the Roman Empire, and I know everything about it, it was a beautiful learning experience. I've started about another six or seven. I've taken a little bit of the Harvard Ethics MOOC, I can commend it to you. Do the two bits in the middle, you'll love it. Don't do the rest, you'll know it all.

But retention success on the regulator will get a big fat zero. I learnt everything I needed to from the sampling I've done. Another aspect that the regulator will have to contend with is that our ability to collect, distribute and learn from feedback is undergoing a very quiet evolution of its own. The sheer numbers who participate in MOOCs means we have access to a large database, which informs curriculum design and its redesign.

And we can get a report instantly on who is participating, what questions they are asking and what the problem areas are. This is personalised learning as we've never seen before and surely once we know a student is competent, and we can evidence that competence, why would we force them to wait 14 weeks and write an exam? The ability to disaggregate within courses means that students and employers can tailor a program quite specifically.

Employers are now beginning to see digital badging not just from MOOCs, but from any kind of learning experience, on a resume. University admission officers are beginning to see them on university applications. TEQSA, the regulator, is now focused on how that evidence is managed and how is it credentialed. But MOOCs are only one pathway and good universities have always had a multiplicity of approaches.

Professor Susan Holmes says: "I don't think you can get a Stanford educational experience online". I'm not so sure she's right. And then she goes on to say: "Just as I don't think Facebook gives you a social life". Well, many parents in this room think that their children only get their social life from Facebook. So we will see that fuse is now a medium fuse and it's burning.

But we are experiencing a tsunami of digital change. First there was the earthquake as the early MOOCs set off a shockwave in our sector. But while they were certainly massive, the early MOOCs were often similar in curriculum design to established credit-based courses. Some of them were brilliant, many were woeful. They don't carry academic credits, are not selective and they take no responsibility for learning results.

The advent of MOOC.org provides the platform for any educational institution business or not-for-profit to build and host courses, subject to a plethora of international regulatory frameworks. The first wave has hit, universities globally are racing to adopt new technology. Many universities are building their own platforms.

The next wave is about to hit, setting off the next round of underwater earthquakes. Enter MOOC Mark II. I have no idea what it is, but it's coming, supported by large amounts of venture capital and government money. The US might have dominated the first MOOC wave, but the large Asian markets have shown great interest in the potential for MOOCs to offer a cost effective opportunity to widen participation for large populations previously without access to higher education. And anyone who read *The Australian Financial Review* or *The Australian* today would have seen the significant investments in this city.

An article in the *Harvard Business Review* earlier this year noted that India, with its scale and energy, had the potential to become a digital laboratory and a growth engine for the world. This second wave is likely to shift the educating paradigm to take full advantage of learning analytics. Universities are exploring different ways in the process to assessment: automated assessment, gamification, peer review. All will personalise assessment and link it directly to individual learning outcomes in a way that endless exams and essays have never done.

PROFESSOR JANE DEN HOLLANDER

Flip the classroom by reversing traditional models. Students can access content before they get to class. They are now responsible for their own learning. Providers are grappling with ways to prevent identity fraud and other forms of cheating. Who is sitting the assessment online? But technological advances, of course, have made it harder to play the system. Plagiarism is almost dead, very depressing for students who used to sell essays. Down the generations, some of you may have bought one or been party to one – that's all gone I'm afraid. It's an area that opens up new markets for the entrepreneurial and may resuscitate the big publishers. Quality though, ladies and gentlemen, will always matter.

The bottom line for students is that they need to know what they are committing to. Employers need recognition of the content and the skills that they are buying and institutions need to maintain and protect their brand. Universities do not sell education, they never have. Anyone who is curious and who wishes to learn can do so without ever going to university. There are many examples.

What universities have owned and guarded fiercely down the ages for nearly 600 years is the credentials we award once the education process has been completed. Our testamur is valuable and has currency. Up until now the testamur of most universities around the world have been badges to represent a set of skills and are, in effect, advertisements about a process and achievement that is well known and widely accepted.
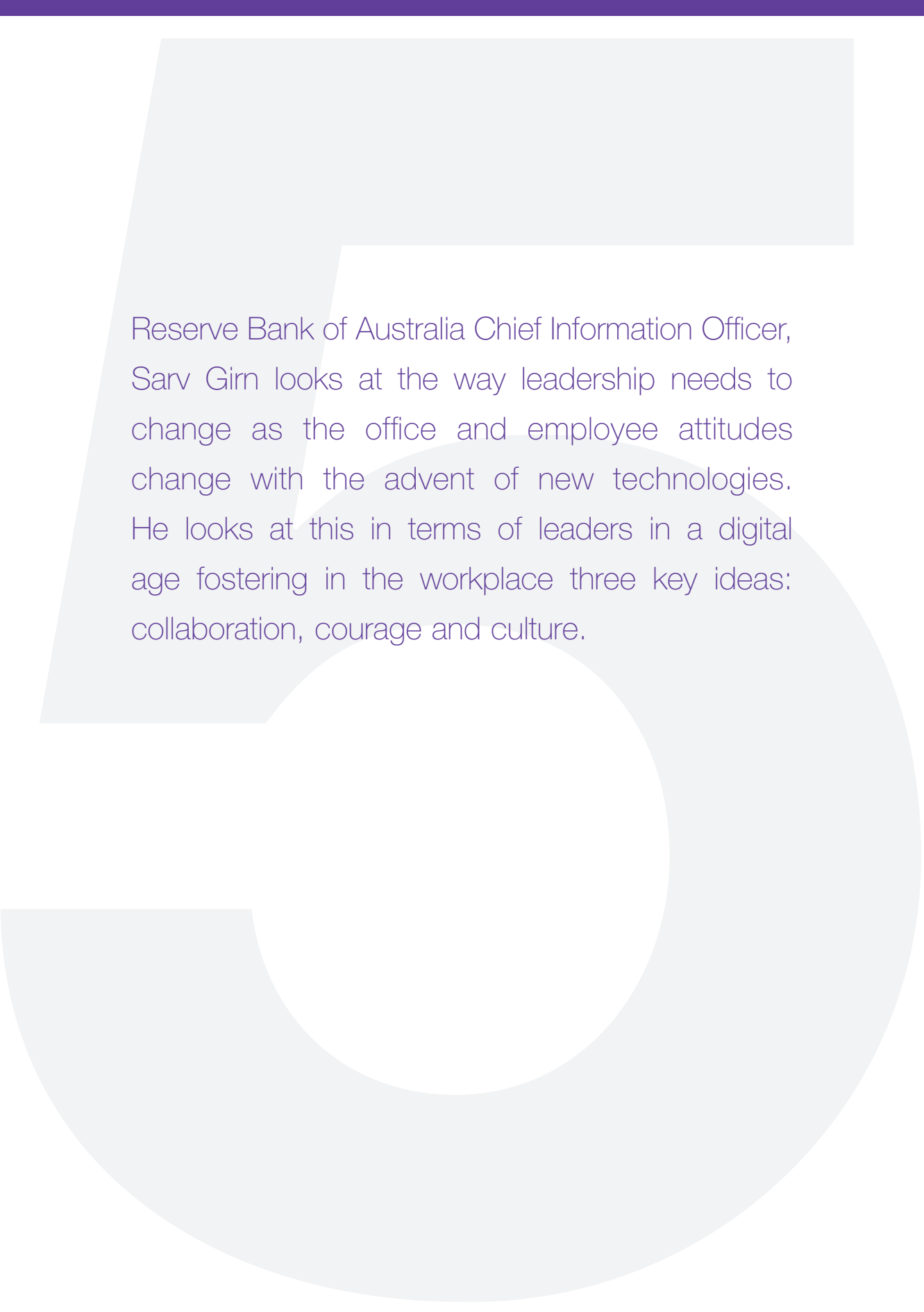
How we continue to assure quality in our global connected world is now a challenge. The game has changed, it is changing again at an unprecedented rate and cyberspace knows no geographical boundaries. The ride will be interesting, there will be winners and there will be losers. I hope the biggest winner will be the consumer, our future students, it's been a long time coming.

Leadership in a digital age

Sarv Girn

Chief Information Officer, Reserve Bank of Australia

Reserve Bank of Australia Chief Information Officer, Sarv Girn looks at the way leadership needs to change as the office and employee attitudes change with the advent of new technologies. He looks at this in terms of leaders in a digital age fostering in the workplace three key ideas: collaboration, courage and culture.

Good morning and thank you to CEDA for the invitation to speak here today.

In my speech for CEDA last June, I addressed digital disruption and the opportunities it presents for innovation and growth in the Australian economy. I also covered the imperatives that executives and boards face in dealing with disruption to ensure their organisations flourish in this ever-changing landscape.

Today I will examine how leadership styles have also been disrupted, with a new digital mindset arising, and how this differs from the traditional leadership approaches we have all become accustomed to over time. While the fundamentals of leadership remain unchanged, there are some vital differences to come out of the digital environment we operate in.

These differences arise from technology being applied in many different ways. At the start of the digital revolution, we saw technology being used primarily to bring productivity improvements, or put simply, doing things faster and more efficiently, with improved quality.

However, now through the application of digital technologies, entire business models are being changed or are disappearing within short timeframes, and new models are appearing just as quickly to address unmet consumer needs – often that were not known of before. The examples of this are numerous and well discussed, and I will not go into these in detail. At a glance, though, we have Uber redefining the taxi industry without owning any cars; Airbnb, which has more rooms available to travellers than leading hotel chains and yet does not buy or build hotels; and Freelancer, where members can submit and bid for project work on a global basis purely via online interactions.

But within the context of this technology disruption that is transforming traditional business models, there is another key factor at play that is also challenging traditional leadership – and that is the behaviour of the people in the workforce, including their expectations, skills and needs. All generations have experienced their unique challenges from a leadership perspective. Generation Y entered the workforce in 1995 with a basic knowledge of the first wave of computer technology as the internet was becoming mainstream. The leadership challenge around that time was in computer skills development, cross-training and new work practices. But Generation Z, often referred to as "digital natives", who will be entering the workforce in the next 10 years, will bring greater uncertainty, as it is the first generation truly growing up in the mobile and internet age. While we can look at the children of today and speculate on their habits, expectations and behaviour in the workforce, only

time will really tell. However, there is no doubt that while generations X and Y will continue to talk about digital disruption, generation Z will come along and wonder what all the fuss is about. To them what we see as disruption is likely to be business as usual.

Being a leader in an organisation in this era brings some interesting challenges when it comes to dealing with the impact of digital disruption. Marrying traditional leadership with newer approaches to people management is a key success factor in today's economy given the change in behaviour, attitude and expectations of the new digital workforce. The technology of the day is not really the issue here in terms of having to understand it; however, having knowledge of technology at a conceptual level is a must.

So, in this context, let's examine some of the leadership traits that are emerging in an ever-changing digital era. Over the next 15 minutes, I will cover three key aspects of digital leadership: collaboration, courage and culture. Clearly there are many more traits we could discuss, and some may even argue that these are no different from traditional leadership traits, but given the emergence of digital natives in the workforce, and the lessons to come out of organisational successes and failures in recent years, I think these three present a good starting point for the leadership discussion.

1. Collaboration

There is a saying which goes along the lines of: "It's not who you work for, but who you work with." This, in essence, sums up the imperative for leaders to encourage collaboration not only within their organisation, but, more importantly, across the industry. A leadership style that inspires discussion, idea generation and inquiry becomes crucial in the context of digital disruption. Many of the organisations that have prospered in this digital age have had a strong approach to engagement across their industry, either for harnessing ideas and possibilities, lining up partnerships for increased market share, research and development, or tapping into the talent pool around the world. This collaboration is in addition to, not at the expense of, a mindset that protects the core intellectual property and know-how of the organisation in a highly competitive environment.

The approach of inventing it all yourself is one that has not prospered when you look at organisational successes. There are many examples of this: Apple, which only designs its devices, and does not physically build them but depends on sophisticated upstream and downstream integration of suppliers; Google, which relies on daily customer feedback on its online services and then reacts and adapts to that in a matter of weeks; and numerous

telecommunications companies that collaborate with phone manufacturers and retailers in launches, plans and unique value propositions.

In the digital economy, the difference in collaboration and engagement required for leaders stems from the fact that ideas and threats may not come from your own competitors, as was the case in traditional leadership where you maintained a healthy network of related business partners and competitor know-how. The insights and ideas may arise from an unrelated sector or an entrepreneurial source that can scale a start-up with unprecedented speed. Clear examples here include the fact that Uber was not started by bus companies to compete with taxis; Airbnb was not set up by a leading hotel chain; Apple was not a music company when it disrupted the music industry; and Amazon was an online book store, and yet it is now one of the leading IT cloud providers and is challenging the traditional heavyweights of computing.

So, what is important for leaders in this era of collaboration? It's a clear understanding of the broader operating environment in the digital economy.

2. Courage

This now brings me onto the second aspect of digital leadership: courage. Courage has always been a key aspect of traditional leadership, but as recent history shows, this is now being tested even more so. Think about the Kodak discussion that hid the digital innovation they invented; or the choices in front of companies like HMV, Blockbuster and Borders, as the market turned digital – should they fight or take flight? Clearly, some of these companies chose to wait and see, and we know what the end result was.

Leaders in the digital economy need that extra dose of courage more now than ever before. They need an approach that is nimble, adaptive and, if required, can reconfigure or reimagine the business model.

This comes from an attitude that encourages a test and learn approach. This is where seed projects and ideas may be allowed to grow and prove themselves, as long as there is also the courage to either stop them as a write-off if they do not deliver value, or, if projects show value, then courage and leadership to implement them, even if they have the potential to redefine the business in non-traditional ways. This is not as easy as it may sound. Often the easiest decision is to continue the investment until the project ends, that is not stop it, or protect and safeguard a traditional business model with a historic revenue stream, rather than implement a new model, for fear of risk in the new world.

There are many examples of this courage and I am sure you face this as leaders too. The ones that come to mind include: Apple re-sizing the iPhone to make it larger when previously the direction was to head the other way; Microsoft, traditionally a software company, entering the hardware arena with Surface tablet devices; and the many newspapers challenged by the choices between print or digital offerings. I suspect all of these directions would have demanded some courageous decisions in the face of some strong internal debate that challenged a long-held status quo.

3. Culture

Finally, we move onto the third aspect of digital leadership, which is centres on culture. Culture is an aspect of leadership that has been important for a long time, but now has more prominence within our digital economy due to a younger more tech-savvy workforce and the fact that many new ideas arise from them. In the past, the top-down management approach driven by a clear vision statement was the dominant leadership style. Today's employees don't just need a vision statement; they also need a challenge or a mantra they believe in, particularly one that allows them to compete. This includes having a very clear articulation of why the challenge or need exists and what fulfilling this will do for the organisation and its customers.

So creating an environment that actively seeks input, encourages new ways of doing things and offers a challenge for teams becomes vital. Coupled with this, and a major source of differentiation, is leadership that allows ideas to flourish and progress without hindrance.

Similarly, leadership that encourage employees to question and debate options, and arrive at a better solution through a diversity of views is just as important. With disruption occurring faster and with more impact, both for risks and returns, leadership that "tests and refines" ideas in this manner becomes vital.

This approach also feeds the new thirst the digital natives in the workforce have for feeling engaged and valued, and wanting to express their view. Often, feeding this can lead to many other related untapped ideas and views being captured. This was seen so visibly in the recent viral phenomenon #thedress, which started off as simply getting a view on colour, but then generated far more discussion on perspectives, diversity and attitudes across many societies and dimensions.

Leadership on culture requires focus across two dimensions. The first is hard-wiring, which includes the policies, regulation and rules that govern a society or organisation and enables it to succeed. In a society or community sense, this is about leadership in laws and rules that encourage start-ups to flourish without inhibitors, and allowing their home presence to be retained as they become successful. It's also about leadership in education curriculums that encourage and develop an entrepreneurship skill set in schools, TAFEs and universities. For organisations, hardwiring is about leadership agreeing the digital strategy up-front in a conscious and clear manner.

For a board, this is now as important as the risk appetite statement seen historically; will you be a leader of change and disrupt your own and others' business models, will you be a fast follower of another firm's innovation, or will you simply focus on incremental continuous improvement through the adoption of technology for efficiency and effectiveness? These are questions that have material consequences to the viability of an organisation, and demand a deep understanding of the threats and opportunities that may arise in the digital era.

The second dimension is softwiring, which refers to the behaviours and attitudes necessary for dealing with the digital era in a societal or organisational sense. In a society, this is about developing a culture that accepts digital change, which supports budding entrepreneurs to pitch ideas, gain feedback and grow. This requires a mindset change: an acceptance that start-ups may fail and an attitude that it's okay for them to start over. For many in Silicon Valley, the number of start-ups an individual has been part of is seen as a valuable saleable credential, not a black mark on their ability. This clearly is a new paradigm for leadership which traditionally may see this as a failure. Organisational softwiring is about a culture that leaders create in order to encourage and motivate people to pursue their passions both within the workplace and personal environment.

There is a lot of talk about work-life balance, but the disruptive world creates a blurred line between these aspects when the company vision becomes a belief that also allows a personal passion to be pursued alongside of this.

Digital mindset in leadership

To conclude, in this age of digital disruption, leadership needs to evolve to embrace new approaches demanded by the digital economy. This is not about forgetting the traditional approaches, but building on them. You could call this two-speed leadership. Successful leaders in the digital era prosper most with a new focus on collaboration, courage and culture.

SARV GIRN

With collaboration, it's actively ensuring this happens; with courage, it's being able to make the difficult decisions, often very quickly with many unknowns; and with culture, it's extending the vision to a passion for staff to own and drive.

In particular though, leadership in the digital era is where business-savvy technologists and technology-savvy businesses coexist. This doesn't mean you have to be able to do the job of the other profession, but it requires people to have an appreciation of the cross-over and value each adds, while allowing the relevant expertise to continue to be respected and applied without barriers. Understanding the concepts and possibilities of social, mobile, data and cloud becomes a necessity for the business; and an appreciation of funding, cost and customer needs becomes the technologists' imperative.

Some may argue the leadership required in the age of digital disruption is no different from the past, and it's about vision, strategy, people and delivery. They may well be right. But when you look more deeply, then leadership today requires a lot more. The speed and nature of the change we experience now warrants this, and when traditional leaders are afraid of technology, or don't quite understand the opportunities or threats it brings, the difference required in leadership becomes much clearer.

Future work: skills, productivity and innovation

Professor Hugh Durrant-Whyte

ARC Federation Fellow, University of Sydney

University of Sydney ARC Federation Fellow, Professor Hugh Durrant-Whyte looks at the future of Australia's workforce and the outcomes of automation replacing particular skillsets and jobs. This is considered both on an industry level, looking at what traits and qualities required in jobs will make certain sectors immune to automation, as well as looking at automation on a regional level, considering which regions of Australia are most prone to automation.

The speaker posits that Australia is going to need technology generalists combined with the creative application of technology in the workforce of the future.

I actually wrote two papers in this CEDA report. One is based on some work that was done in the UK on predicting what might happen in the future in terms of the types of work that might be automated or computerised, and I think it's very relevant for Australia, and relevant in the particular context in which it exists in Australia. The other thing I will discuss is what this means about the way we need to teach younger people about their approaches to employment in the future. I think that's going to be very important.

Australia leads the world in the kind of automation that's going on in the area of big field robotics. Up the road is the Port of Brisbane, which is completely automated. For those of you who read the paper today, news from Asciano, Port Botany is now completely automated as well. The workforce has gone down to less than half of what it was in previous years. Of course there's the mining automation work going on in the Pilbara. Most of what happens in the Pilbara mines is actually now run, believe it or not, from Brisbane.

There's a lot of work going on in the automation of agriculture, there's a lot of work going on in remote operations of everything that's out there. In some sense it's not new, it's not even novel, because we've been doing this since the 1700s. It's just more and more mechanisation. It's just that we mechanise now with computers as well as machinery. I think that's particularly important when you look at what's going on in the services industry.

I think some of you may have read *The Economist*, it might have been about a month ago now, the publication was talking about the new age of artificial intelligence (AI). AI, in fact, is a term that was invented back in the sixties and we kind of worked on it for a long time and figured out that actually, it was pretty hard – it was much harder than we all thought it was. But increasingly, as we've got lots and lots of data – and it seems to me that data is probably the key to artificial intelligence – we're able to learn and recognise people's jobs and repeat those jobs, particularly if they're routine or they're analysis type jobs. Where actually replacing the job with a computer effectively means more efficiency than the job being done by a human.

But again to some degree this is mechanisation. Very few of us now have a secretary outside our door that uses a typewriter, we use email instead. So this is, if you like, a progression from what has gone before. So the work that we started out with and we were asked to do by CEDA, was to essentially try and predict where current jobs are going to be in the future, and what the impact of automation and computerisation will be in the Australian context.

And just to add a little bit of irony to it, we used artificial intelligence techniques to do this. Assisted, of course, by some humans along the way. So the way this works – and most of the detail is in the paper, but I'm going to just give you a sense of it – is we started, for various reasons, with the US job classification codes. Associated with the job classification codes are the qualities of jobs, for example: how much manual dexterity do you need for this job, how much creativity do you need for this job, how much social understanding do you need, and so on.

So that kind of tells you a little bit about what's in each job. So if you're a dishwasher, you don't need too much social intelligence, but if you're in public relations you do. And it's more likely that if you have low social intelligence in your job that that could be automated, whereas if you have high social intelligence, then AI has a problem doing that. So that's the kind of first step in this process.

The second thing is we've got a really good bunch of very clever guys to sit in a room and pick 10 per cent of those jobs and tell me whether you think they're going to be automated. Are they going to be taxi drivers? Is it going to be surgeons? Is it going to be lawyers and things like that? And on the basis of that, try and predict what qualities are in jobs which are automatable. You then apply your artificial intelligence techniques to predict across all jobs what qualities in those jobs will make you automatable and therefore which jobs are likely to remain and which jobs are not likely to remain.

So if you take that from all the different job descriptions, 702 of them, you get these maps. These basically tell you how each of the different jobs versus each of the different skills that you might want to use – and we've only picked a subset of them here incidentally that are available in the US codes – what's the probability that that skill is likely to be automated in that context?

I'll come to the caveats in a little bit, but you get a sense here that what we're trying to do is to understand what skills people are going to need in the future if they're going to have a job that's not going to be automated or computerised. What that really means is we've got these latent variables, these underpinning things, that are skills that we want to train people to have in the future, because they're the things that are going to be human in the future and not automatable.
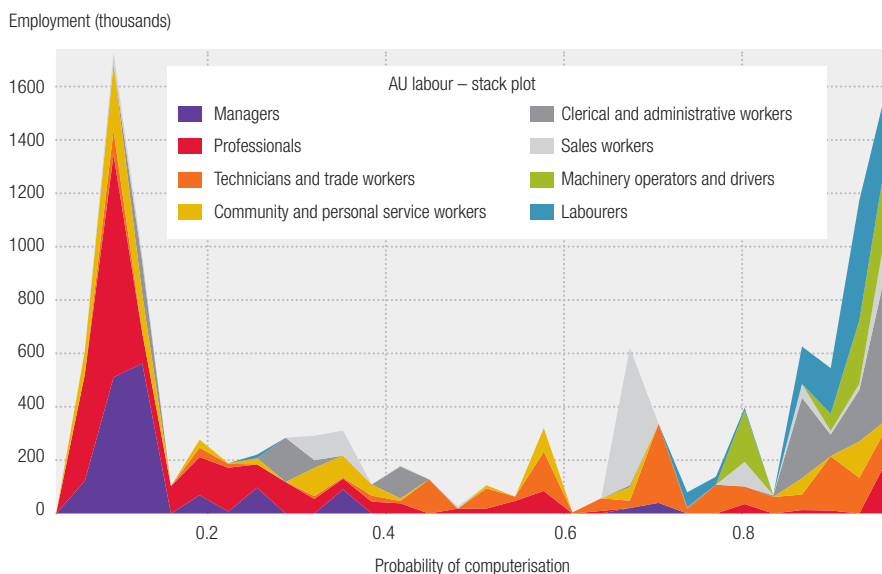
And incidentally, what we did then is we cross worked that from US data, not only into Australian data but also into UK data and a lot of other sources. So we can see what it impacts in different types of countries and also, as we'll see in a minute, different regions in Australia as well.

So first, some caveats. The first thing you've got to remember – this is a guess about future technology. A bunch of people sat in a room and said, "What's going to be automated or what's going to be computerised?" They may be experts, but they're still fallible. You need to think of these predictions not as what's going to happen in the future, but what we need to be thinking about now. That's the value of this kind of prediction.

The second thing is, I am only reporting the jobs that are going to be lost and there are clearly many jobs that are going to be added. Jobs that you've never thought of are about to be added because of the capacity that's here. So please don't think of it as we're about to lose X number of jobs across Australia, that's not the case.

So here's some basic data, the top level data. What it says is there are about 40 per cent of current jobs out there in the workforce which are likely to disappear because of automation and computerisation within the next decade. That actually, in truth, shouldn't come as a huge surprise. If you go back a decade and imagine where we used to be and where we are now, we've probably gone through that kind of change already. So although it's a nice grabby headline, it shouldn't be a surprise in that sense.

I think more interesting is actually this graph, and this is the one that actually causes me more concern because what it shows you is the types of jobs that are going to go and the types of jobs that are not going to go. And, more importantly, the fact is that the job market is going to become very polarised.

Employment (thousands)

AU labour – stack plot

- Managers
- Professionals
- Technicians and trade workers
- Community and personal service workers
- Clerical and administrative workers
- Sales workers
- Machinery operators and drivers
- Labourers

Probability of computerisation

So there are going to be interesting jobs for people who are creative, who know how to put together technology, all these sorts of things and they're going to do really well and make lots of money and, I hate to say it, at the other end there are going to be burger flippers.

And I think one of the big issues with technology that we need to grapple with as a country, as a nation, is the fact that we're hollowing out what's going on in the middle. The people who used to have normal middle-class jobs, being in a bank that sort of thing, they're all going. So this picture is probably more important than the former one.

The jobs that are predictable, repeatable or analytic, that is they're just about analysing data, they're the ones that are going to go. When analysing data, we can do it better with AI than humans in almost every circumstance.

The jobs that are not going to go are those that are about originality. I now use a phrase: *the creative application of technology to problems*. That doesn't mean you're a technologist, you could even be a lawyer and figure out how to apply the latest thing off the web to solve searching your documents, and be a creative applicator of technology. So creative jobs are going to remain as well as those that I think have deep social skills.

And I'll even go further and say those are the kinds of jobs that are going to grow, that's where the future is going to be. It's about, if you like, personalising, customising, doing something useful, value added with the sort of raw technology. Partial automation, that's already been mentioned. Certainly in the primary sector if it isn't automated in 10 years there has to be a good reason why it isn't. And partial automation, remote operation, these sorts of things are going to be absolutely critical and importantly, I suspect, a big use of things like the National Broadband Network (NBN) will be for that type of application.

Polarisation, there's been now a decade of study of polarisation of jobs in Europe and the US. There's almost been nothing done in Australia and it's very prevalent over here at the moment. Last year there was also a book released by Thomas Piketty, *Capital in the 21st Century*, which describes the impact of the polarisation of wages, and I think this is something we probably need to be concerned about.

We also did some fairly sophisticated work to try and understand how the impact of automation might actually play out across the country and regional areas. And there are some important parts of this and, although I don't have the data in this report, I have also done it for Queensland, Brisbane and the Gold Coast. So if you're interested in that data I can always provide it.

You see here there's a kind of reflection on what I've already said. If you're in a rural mining community, you're going to lose jobs. Whereas if you're in an urban area you're going to gain jobs. I find it an interesting irony that despite the fact that we can now communicate instantly to anyone everywhere, what we're choosing to do and what employers are choosing to do, is to come together in precincts where people can actually work together in different ways.

You see this dominantly in places like Sydney where you now have a Creative Quarter. You go to London, there's the Knowledge Quarter. You go to, the obvious one is Silicon Valley, but now there's the Boston Highway. And everyone migrates to them.

I think the big impact in Australia is that we're going to become even more urbanised and less rural and I think there's a worry in that as well. So there's a geographic polarisation as well that's a consequence of this type of analysis. Regional jobs in primary industries will be lost. I think there will be an increasing trend to urbanisation. For places like the Gold Coast, I think this is an important driver for how they might think about themselves in the future.

We're very focused now on creating knowledge hubs like the MedTech precinct, like the FinTech precinct, because once you've got good talent it attracts good talent and that's really what's happening in these processes. So I think there's a good message in there for different cities.

So here are my conclusions from all of these reports. I really enjoy doing this work so thank you, CEDA, for asking me here today. I've read lots of really interesting papers and other things, and I've come to the conclusion that everyone in this room, no matter what your background, if you're a media person, an artist or whatever, you are going to have to know and be able to apply technology in the future. We're going to need technology generalists, the creative application of technology. That is the future.

We will be individual companies and individually employed, but we need to know how to bring that together no matter what area we're actually in. We will still need, of course, specialists, people like me who can actually write algorithms and do maths and so on. But actually, to be honest, what I've learnt in this process – and there's lots of literature now in Europe and the US – is that more STEM is not the answer. I'm sorry to say but there are too many taxi drivers like that who are unemployed physicists and computer scientists because no one's taught them how to apply that technology to solving problems.

So more STEM, yes, we need STEM, but we need to actually explain at school how to be an entrepreneur, how to be creative, how to be original and how to apply that all the way through what we do.
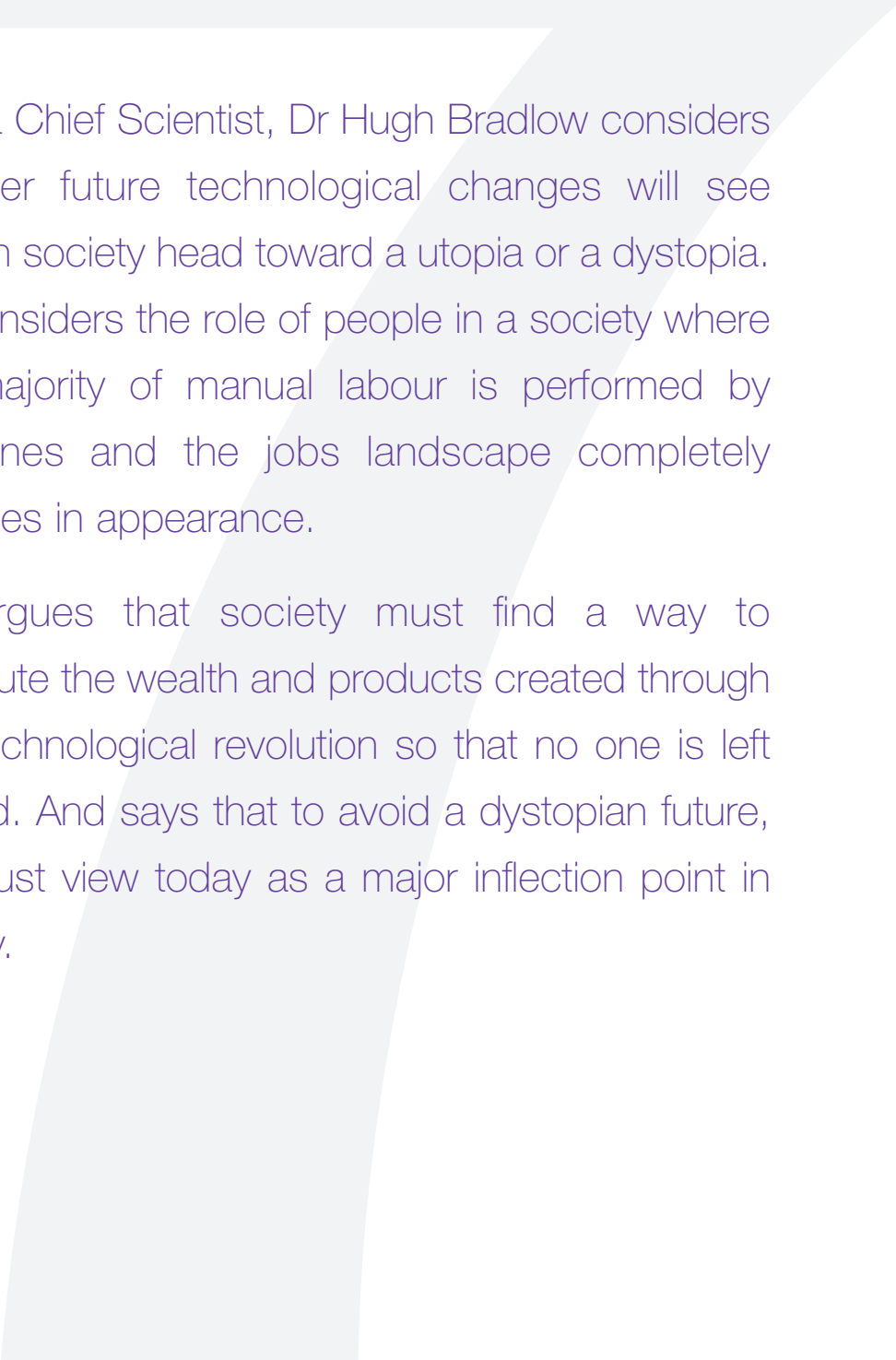
As I said, I think there's significant implications for urbanisation, for business development, and lots of things like that, and I will say it's motivated me now to at least ask our state government whether they're going to fund some extra research in this area. For them to really say okay, so what does that mean in terms of the strategy for a state, or the strategy for a city, in the way that we might actually create the right kinds of jobs going forward, and actually what right kinds of skills we might actually use in that context.

Australia's future workforce

Dr Hugh Bradlow

Chief Scientist, Telstra

Telstra Chief Scientist, Dr Hugh Bradlow considers whether future technological changes will see human society head toward a utopia or a dystopia. He considers the role of people in a society where the majority of manual labour is performed by machines and the jobs landscape completely changes in appearance.

He argues that society must find a way to distribute the wealth and products created through this technological revolution so that no one is left behind. And says that to avoid a dystopian future, we must view today as a major inflection point in history.

I am going to talk about change today, technology change in particular. What I would like to get across is why our workforce of the future is going to be shaped by technology. It's potentially a very frightening prospect and that's why I've put this question at the end of my presentation title: Are we heading towards a dystopia or a utopia? We're at a unique point in human history where we can actually influence that outcome.

Personally, I think a lot of the facts that you're going to see in this presentation are very frightening, but I also think that we have an opportunity to create a new society that will be a utopia. And a lot of you will think I'm a dreamer but to quote Lennon – that's John not Vladimir Ilyich – I think I'm not the only one. Let me tell you why I'm a dreamer.

If we look at technology change, we've all seen a massive amount of technology change in our working lives. Forty years ago I would program a computer with front panel switches and paper tape. Today I have in my pocket more computing power than existed at that time in the world, and it's connected to this massive global infrastructure of information.

However, I think that anything that I've seen in my working life to-date is going to be dwarfed in the next 10 years by the technology change that's coming. I'd like to start off spending a few minutes talking about the major changes in technology, then I want to give you a worked example, so to speak, of how this influences the future of working. Then I want to talk a bit about the future of work itself and the implications from that.

So let's start off with digital transformation. There are four things that are happening at the same time: The way we interact with technology, the way we interact with each other mediated by technology, the way we look at the physical world and the way we actually calculate what is happening. All of those are changing at once and I'm going to briefly touch on each of those.

So the last 25 years of the 20th century were what I call the age of the geek. People had to adapt themselves to technology. It was a wonderful time for people like me, because I was part of an elite group who could actually use the technology. But for most people, it was out of their reach in terms of accessibility. The first 25 years of the 21st century are about technology adapting to human beings. Today we're able to speak to technology using voice and natural language, we are able to gesture at technology, we're even able to have it track our eye movement and we are starting to see the emergence of being able to think through technology using brainwaves.

Technology itself is disappearing into our lives and it is becoming an intuitive part of them. We can see this through the notion that people actually want to watch the media that they want on demand, as opposed to having it sent to them by broadcasters. By the end of the decade, more hours of TV will be watched on broadband than broadcast, and that's changed the way we have to design broadcasts.

By the way, an interesting statistic is that this year in the US there are more hours of TV watched than average hours worked, which is a frightening statistic in itself. So when you take this new broadband and you combine it with new screen technologies, you create the opportunity for immersive communications which is almost teleportation.

For this example I would like to talk about a thing called Microsoft HoloLens. It's an augmented reality pair of glasses. What it does is it overlays the digital world onto the physical world. And in this particular example here a father is helping his daughter do some plumbing in her flat. He can see what she's looking at and he's able to instruct her using an iPad to show her what she needs to do. And she sees instructions overlaid on the actual plumbing operation.

What that's done is it has broken the nexus between work and place so you can work from anywhere. In the top left that's my office, fully integrated Telstra office. I have video on the LAN, but I actually have it in my home out in suburban Melbourne.

Over the last five to 10 years, we've seen a flood of new sensor technology. These sensors can measure just about anything you can think of. They can measure your pets, they can measure your body, they can measure your bridges, they can measure your roads, they can measure the atmosphere, they can measure chemicals. You name it, you can measure it. And those sensors are starting to communicate, which is giving rise to this term which I hate, "the internet of things". Which is the notion that all sorts of physical things are now online and that creates a view of the physical world that enables you to understand it and control it.

So now you start using digital technology to control the physical world. What are we going to do with all this data? So you take the data and the fact that we have abundant computing and you use it to train machines to do pattern recognition like human beings do. So what we're seeing are a new generation of artificial intelligence technologies like neural networks – which are based on the way the human brain works – which enable us to train machines to do human things.

IBM have a technology called Watson. They've literally sent Watson to university. It's doing the same course as a human medical student at the Cleveland Clinic. The difference between Watson and a human being is Watson can absorb the 20,000-odd papers that are produced every month in medical research whereas a human being clearly can't cope with that volume of information. And on the basis of all that knowledge, Watson can then perform differential diagnoses. It changes the way we compute.

We're even building new computer systems based on new technologies, such as ones that are based on neural networks, or based on what's called quantum computing, which is so weird and wonderful that it requires a complete reframing of the way we think, even as computer scientists. But those computers will do artificial intelligence in a much more effective manner.

So what does that mean in the real world? Well, let's take traffic and transport. Twelve years ago people said it was impossible to create a self-driving car. Today that's done and dusted. The technology is there, it's completely proven and every major car manufacturer expects to introduce a fully autonomous vehicle by the end of this decade. I have a theory that by the end of the next decade governments will be forced to regulate that all vehicles are autonomous and that human beings aren't even allowed to touch the steering wheel, because 90 per cent of road accidents are human error.

In Australia today we have 1200 road deaths a year and 50,000 hospitalisation injuries as a result of that. So with one piece of technology you can actually save 1000 lives and 45,000 hospitalisation injuries every year. Governments will have to regulate that and the technology to retrofit existing cars is already coming on stream.

This would mean that you can then dispense with traffic lights entirely and that then leads to a much more effective use of the overall road system. What that got me thinking about was road construction. So if you think about roads today and you think about our population and you think about the fact that counterintuitively the number of vehicles per person growing, which I find very strange, and you extrapolate based on population growth.

To account for this growth road capacity will have to grow by about a factor of 2.5 between now and 2050. But then you say, okay, let's correct for the sharing economy, Uber and GoGet and the like, which brings a bit of a down tick. And then you say, let's correct for immersive communications which give you telecommuting which takes you another down tick. And then you can add to that correcting for autonomous vehicles.

Then you notice by 2050 the road capacity is back to where it is today. So in its simplest form, if you're thinking about a huge amount of construction jobs in Australia based on population growth going on forever, that's clearly not going to be the case. And there are all sorts of additional benefits that come from that configuration of the road system.

So let me end off by talking about the future of employment. The first thing to notice is that the nexus between work and place, as I said, is broken. So that enables participation by non-traditional groups for example, people with disability or elderly people. The workplace becomes much more accessible to them, which is a very positive thing.

However, existing jobs are going to have to change dramatically. So we did a relatively simple study, which is in the CEDA report, where 28 per cent of jobs involve driving. That driving component of jobs in this world that I'm talking about is going to disappear entirely because they won't be allowed to drive, so those jobs have to morph into something else.

Perhaps more threateningly, Oxford University did a study on the US job market. It's a very well-known study. Basically, what they did was they took the 720 job categories and they've said that any job that doesn't fall into the categories of creative intelligence, social intelligence and perception and manipulation is going to be eliminated by automation. And if you add up all the workers in those job categories, then they're 47 per cent of the workforce.

However, I think that's conservative because what they didn't do is look at jobs that are not going to be automated fully but where automation is going to change the productivity of the job. So if you think about any professional job, all of us spend a lot of time doing report writing and data collection and things like that. In the future world the report writing will be done automatically for you by a machine.

So you can eliminate that amount of time that you may spend in your daily activity – it's going to vary from job to job, but let me just take a rough figure and say that 20 per cent of our work time is spent on that type of activity – that's 20 per cent of work that's eliminated.

It's not only the jobs that fall into those categories that they looked at in the Oxford study, but also all existing jobs will be subject to this phenomenon of automation. And that has a huge implication for the way we select students today. So if you take medicine, for example, fortunately it's getting better now where the medical schools were abrogating their selection responsibilities to the Undergraduate Medicine and Health Sciences Admission Test (UMAT) and Australian Tertiary Admission Rank (ATAR), and that produces people who are

extremely good at manipulation, but that manipulation can be replaced. What you're going to need is something totally different.

And my own view is that the future workforce emotional quotient (EQ) is going to be far more important than intelligence quotient (IQ). It's going to be our ability to relate to people, to have empathy, to work in multidisciplinary teams with other people – that's going to be the determinant of whether you have a job or not.

There's a second thing I want to add here, which is people say to me: okay, the machines are taking over, why do we need to understand the so-called STEM disciplines of science, technology, engineering and mathematics? And that is very much the wrong question because in this new world where everything is technology dependant, it's absolutely vital to have an understanding of the underlying scientific method that goes into how these things are constructed.

First of all, if you don't, you can't make the informed choices. The second thing is if you don't understand the underlying functioning of the system when things go wrong, and they inevitably always do go wrong – that's one thing as an engineer I can tell you with absolute certainty – then you don't have any idea about how to tackle adversity.

So no child should leave our schools in the future without literacy. And I'm talking about literacy in STEM, we should treat STEM in exactly the same way as we treat reading, writing and arithmetic today. It's something that every kid should have when they leave school.

In conclusion, is it a dystopia? Maybe. For example, a lot of people derive their self-esteem and their meaning from their job. I come from a generation where that was the case, and being without a job is a frightening prospect. On the other hand, I also came from a generation that witnessed the way communism worked in Russia, where everyone had a job but the job was meaningless and so they went into work and drank a bottle of vodka every day. So it's not necessarily the case that we will derive esteem from our job.

And the next generation tell me, when I raised this with them, that's no worries, we'll go and sit on the beach. So I think that's important to recognise that there's a generational change there.

The second point I have here is Einstein made this classic remark that research is one per cent inspiration and 99 per cent perspiration. When the machines are doing the perspiration you're stuck with a one per cent inspiration. So that's going to be a frightening prospect for all of us, including myself. I am not really sure I want to be left with that one per cent.

DR HUGH BRADLOW

But let me flip it around and talk about the utopia and why I'm a dreamer. We are going to be – well, not us but my kid's generation – are going to be the richest generation in human history. There's going to be unprecedented wealth. If you measure wealth in terms of the bottom two layers of Maslow's hierarchy of needs, then those will be totally catered for by machines. So there is no reason that anyone is going to be homeless, starving, etcetera, because the machines can actually deliver all of that to us in a way that we don't have to work for it. And there's a great possibility that under those circumstances people will genuinely follow their dream because there is no reason for them not to.

I believe we can enter into an age of wisdom or an age of enlightenment based on the fact that we'll unleash a whole new generation of human creativity. If we're going to do that we've got to reorder our society to ensure that no one is left behind. I'm not talking about wealth redistribution. I'm talking about wealth distribution; new wealth being distributed in a way that no one is left behind. And that's the message I want to leave you with is go out of here recognising that we're at a major inflection point in human history and now is your time to grab the future and to make it work for everyone.

8

Facebook and the mobile economy

Stephen Scheeler

Managing Director, Facebook Australia and New Zealand

Facebook Australia and New Zealand Managing Director, Stephen Scheeler looks at how mobile phones have quickly become a dominant force in Australian commerce, discussing how Facebook has been capitalising on this trend, and also exploring how other businesses can make the most of mobile as a means to deliver unique customer experience.

The speech is a fitting progression from Chapter 1 of this publication, where Mark Pesce made predications in 2011 about the future of mobile in Australia in 2016 and beyond.

Thank you very much for my invitation from CEDA, I appreciate it. I also deeply appreciate the time and the attention that you guys are giving me here today, and I use that word attention very deliberately. You all have a host of responsibilities on your mind as we sit here today. You've got things back at the office, you've got things at home, you've got things that are trivial, important and some things are just distracting, all going through your mind.

Even as I'm speaking now, your minds are wandering. But you've also got something else that's magnifying this and it's sitting right there next to you or it's in your handbag, or it's in your pocket. It's that little high tech angel of connection, or it's a devil of distraction – depends on your relationship with it, depends on the time of day. And right now it's sleeping, it's slumbering, it's on silent because you're being polite to me and polite to everyone sitting around you, but for you, I guarantee, it's talking to you right now. It's saying, "Pull me out". You've got that urge: "Pull me out, open me up, have a look". Who doesn't have that urge right now? Put up your hand. We all have that urge.

And so as we go on today for the next 30 minutes, while I'm talking up here, every one of you is going to feel that urge to check your phone. It's universal. This feeling has become virtually a primal reaction that we all have, akin to other basic instincts like fight or flight, or our cravings for food or companionship or love. The fear of not being with our mobile phone has become a thing and it's not going away anytime soon. Everyone in this room feels it. Many of you are going to give in to that urge over the next 30 minutes, especially if I become boring or if I drone on. And I don't have any slides – I'm kind of winging it a little more today. But that's okay, I don't mind, I completely understand; because I know many of you will be checking Facebook or Instagram, so I only have myself to blame if you glance down at your phone and I won't be calling anybody out, so don't worry.

Now, before I move on, I have two quick confessions. One is, despite my accent, I have in fact lived in Australia for a very long time, almost 30 years. When you get beneath my skin, I'm less American than I am Australian. I probably spread Vegemite on my toast every morning. I am a master of barbecue cuisine and hopeless in the kitchen, like most Aussie men, and I'm also bizarrely fascinated by the impending prospect of a president Donald Trump.

Confession number two is that today I may slightly give a few plugs for Facebook and so I apologise for that in advance. I do this with a mixture of both humility and intent because I truly believe that Facebook is opening up opportunities for business on levels that are unprecedented and I've got some great examples today.

Today, one in every three minutes on mobile in Australia is spent on Facebook or Instagram. Think about that for just a second. There's over one million apps in the Apple app store. There's over one million apps on the Google app store. There are probably dozens of apps on your phone. Of all those millions of apps, two, Facebook and Instagram, take up one in every three minutes that people spend on their phones. All the other millions are the other two thirds of the time. So, when you talk about mobile, and when I talk about mobile, you really have to talk about Facebook and Instagram and how that fits with your strategy.

Now, I want to tell you a little story about a business that I know you'll be familiar with. Everybody in this room will recognise this. It's a business with customers that queue outside its store every day and it's a business where customers even queue in the rain and it has customers so loyal that they disregard any other competitor, even though that competitor's product is actually cheaper. This business isn't a large retailer and it's certainly not a well-known brand but it's one close to my heart because I visit it almost every day. That business is my local cafe. And I'll share a bit more about that cafe during the course of my talk.

Now, there are three things today that I want to impress on you while we all have this time together. First, Australians are infatuated with their mobile phones: every age group, every demographic, every income category, everybody. By some measures, we Australians are the most mobile people on earth. This is certainly true when it comes to Facebook's largest platform; in March this year, globally, we had more than one billion people use Facebook on a mobile phone every day. In Australia, we had 11 million people use Facebook on a mobile every day and the number of people coming to Facebook every day, exclusively on a desktop device, has dwindled to nearly zero. So, our user space in Australia now is almost overwhelmingly mobile every single day. This is the first country in the world where Facebook has hit this 100 per cent mobile milestone for daily active people on our platform. Australia, by this measure, is the most mobile country in the Facebook world.

So, this infatuation with mobile in Australia is having a profound effect on virtually everything in our economy and our society. Think about your own behaviour and how you consume information. Everything from entertainment to shopping, education, news, people to people communications, politics, organisational design, even language, OMG, LOL – who even heard of those terms just a few years ago? – are all driven by mobile. And of course, the impact on business, how we do business and the types of businesses that we can create is huge.

Second, there is a greater opportunity than ever before to know your customers and your potential customers because of mobile. And you absolutely, positively, need to get on top of this, because this train is now really picking up speed. Each one of us not only expects to be treated in a personal way, we demand it and we demand it all the more with the personal device that is our mobile phone.

Years ago, before the invention of the first mass media, such as newspapers, the only real way to market to your customers was one-to-one, kind of like my barista does today when I walk into her shop. She knows me as an individual and so she tailors her message and services to me accordingly. But the rise of mass media over the past decades meant that businesses could reach larger audiences than ever before. But, there was one kind of big problem and that's that these businesses didn't really know who they were talking to, they just knew that they were talking to a lot of people. Now, this is akin to my barista going into a crowded street or a crowded theatre or a crowded stadium and yelling, "I make great coffee". It's a really successful business model if you have the right infrastructure to do it, but it's not the kind of business model that really appeals to individual interaction – the kind that you get with your barista every day.

So, brands were developed, and they were developed as businesses' answers to this problem. In the absence of a one-to-one relationship, a brand essentially became that personality that a business projected to the mass group of faceless consumers it was trying to reach. Now, this era of mass marketing to anonymous audiences is still around but it is changing and in some ways, it is dying. And I'll give you a very real demonstration of this in just a moment that you'll be able to see for yourself.

My third point today I'd like to impress on you is that you need to stop talking *at* your customers and you really need to talk *with* them. And this is about the things that they're interested in, at the time that they want to hear about it, and through the medium they use to connect to their worlds every day: their mobile phone. Reports from SAP talked about how people don't feel like they're getting relevant content from Australia's biggest companies and advertisers, and that is a big problem for all of us. A few years ago, that wasn't such a big problem because there was only one way to deliver that content generally, which was through mass media. So, it was generalised. You showed the same message to everybody. That has changed and the expectation of users has changed through mobile. Our job as businesses and as marketers is to shift from this mindset of interruption of broad based, anonymous groups of consumers to one of relevancy and value based insight into who we are talking to and what they really want to hear.

Now, business has been moving in this direction for some time now. This is not new news. But the rise of mobile has no doubt accelerated this imperative. Loyalty programs, CRMs, net promoter score, lifetime value, all of these things have been around for a long time. But with the rise of mobile, we're now entering an era where a whole generation of consumers are growing up with total customisation of their personal technology. So, think about your own collection of apps on your phone and how you use them. It differs from anybody else that you know and you have total control of the media consumption.

I'll give you a little example from my life. I have a four-year-old nephew who loves the *Lego Movie*. Like many kids have, he's watched it 100 times on DVD. You don't know how they can watch it so many times, but they still do. Now, one day he wanted to watch it again but the DVD player was broken and there was no other option for watching the movie except – and this is a real story – by coincidence, the same movie happened to be on free-to-air television that night. So, my sister-in-law promised him that he could sit down at 7pm to watch the *Lego Movie*.

Now, there were two things about this experience that really jangled my four-year-old nephew. First, of course, was, "Why do I have to wait until 7pm?" Now, his mother couldn't sit down and explain to him, "Well, free to air television's a linear experience, it was developed decades ago and, you know, it's not like the anytime experience that you're used to". So, he didn't get it. "I've got to wait until 7pm? I don't understand why."

But the second thing that was different about this was even more disturbing for business. So, when the first commercial break came on during the movie, this kid reached, of course, for the remote control as he is used to doing with his DVD player. He tried to fast forward through the ad. When he realised that this didn't work, as his pressing the button had no effect, he put down the remote control and he said to his mother, "Mummy, the movie is broken". By the second ad break, he was off to do something else. He was refusing to cede control of his media consumption to an interrupted brand that was completely irrelevant to his reality. He doesn't have any money, anyway. Why is he seeing ads?

So, when you think about that, it's kind of amusing but it's also kind of profound, because this is a generation that's coming up with these expectations and these media consumption behaviours and we have an economy and businesses that are not built to service those expectations. And it's not just this next generation that's coming along, I would argue that it's here in this room right now.

So, I want everyone to do something for me. Everybody could you pull out your mobile phone, please. I heard people gasp. Open it up and if you have Facebook or Instagram on your phone, please open it up now. And take the phone and hand it to the person next to you. And just have a little scroll through their feed…

This always happens, every time I do this, everybody starts talking, right? You start talking because you're starting to feel something. So, just shout it out. How does it feel? Awkward. It feels strange, doesn't it? Okay, give the phones back now. That's it. The fun's over.

It makes you feel a little strange. I've done this for a while, with different groups, and it's actually a really good thing to do and you should try it yourselves, because it brings out a reality. It makes you feel like you're reading somebody's diary and that's what somebody said to me once. "I'm reading somebody's diary." I said, "That's exactly right."

And it's a real insight that we all think that we know what Facebook is. The reality is that all of us do know what it is, but in a way, none of us know what it is. Because today, there's over one billion Facebooks. In this room there's 250 people, so there's 250 Facebooks. There's 250 Instagrams. And this is not just a party trick, it really matters for your business. And I'll explain why it matters.

There's two big reasons why this matters. One is that Facebook is built on something that you just experienced. It's a simple but profoundly powerful reality and it's something called unique identity. Facebook knows who you are and the things you love, and that's the curative experience that we give you. That's why Newsfeed is so compelling. That's why people love it so much and that's in our DNA.

Unique identity is the reason everyone's Facebook feed is different, including the ads that appear in your feed. No two people see the same mix of content on Facebook and neither do they see quite the same mix of ads. Because of this thing called unique identity, advertisers can target their content on Facebook and Instagram to only those people that they want to reach, whether they're using Facebook's native data, a combination of our data, your data and even third party data. This data is super powerful and it is the future of your ability to reach your customers. This is powerful because it allows an advertiser to target only the people they want to talk to. It also allows them to talk to these people over a period of time, thus evolving the messages that they want to convey. This is really powerful as well and I'll give you an analogy that'll bring it to life.

Imagine the TV in your living room, sitting there on the wall and it knows – it just knows – that you are in the market for a new, mid-priced SUV. So, it shows you an inspiring ad for the new Toyota Kluger. "Wow, that's kind of relevant to me. That's nice. It's got me interested." It sees that you watched the ad. It knows that you saw it and it knows, further, that you're interested actually in the safety features of the Kluger for your two young children.

So then, a little while later, it shows you a different ad, just about the Kluger's safety features. Okay, that's even more interesting, more relevant to you. A little while later, maybe a few days, it shows you an ad about pricing and financing about that new Kluger and then, later, it shows you an ad for a test drive and lets you easily sign up or simply call the dealer. And maybe that test drive ad actually screens on Saturday morning when you get up, and that's the day you're going to go for a test drive. The TV even knows other places that you consume media and places relevant ads about Kluger there as well if it feels that the content in those places will resonate with you and move you along the marketing funnel.

Finally, after you've actually converted and you bought that new Kluger, the TV stops showing you Kluger ads altogether. You won't see another one. Or, perhaps better yet, it changes the type of ad that it shows you to one which focuses on getting your new Kluger serviced with your nearest Toyota dealer. Again, something that's useful for you, that's relevant to the fact that, "Hey, I just bought this car."

Now, this is not how TV or traditional media works today. In fact, it's not how almost all digital media works either. Think about the times that you've seen repeated ads fired at you and you were like, "Hey, I've just bought that thing", or, "Hey, I just got back from Bali. I'm not looking to go to Bali now".

I used to work in a car business and I spent a lot of time on other car makers' websites, just researching things. Guess what I got bombarded with all the time? Car ads when I was online and I was not in the market to buy a car. So, this is not how traditional TV works, how traditional media works. It's not how most digital works but it's exactly how Facebook and Instagram work, because they're founded on this incredible valuable nugget of unique identity that you all just experienced.

Now, there's another reason that unique identity really matters to business. It matters because it's driving this profound change in how consumers want to engage with businesses and brands and the products and services they offer and you felt that yourselves when you swapped phones. You were living in a different world. You want to be back to your safe, curated, familiar world of Facebook and the type of messages you want in there, be it from your friends,

family or from brands, you want to have that same kind of feel. So, in the area of mass marketing, everybody got the same message, often over and over again.

And that's why you've seen the same TV ad for the new Kluger 25 times, even after you bought that new car. So, this is both incredibly wasteful for business and incredibly annoying for consumers – it's actually a bad place for everybody. But on mobile, in your Facebook or Instagram feed, you, the user, the consumer, the real person looking at that screen, you are in control. It takes a flick of your thumb to eliminate an ad from your view. You can do it in a nanosecond.

In this new mobile world, bad, irrelevant messages from businesses who can't or won't understand their customers will lose, and many of them will die. But the good news is that the marriage of Facebook's data, your data and third party data provides the perfect tool you need to meet this challenge.

Now, back to my local coffee shop. The reason my barista is running a great little business is not that she's got better staff or better machinery or even better coffee. Sure, all those things are important. They all contribute to the quality of the value proposition that she presents to me. But the thing that she's really brilliant at is knowledge. Knowing her customers. And knowing how, when and why to speak to the market.

She never asks me if I want my banana bread toasted because the first time she offered it to me, I declined, mentioning that I preferred it untoasted. She always remembers that I have a flat white with one sugar. In the brief moment it takes to order a coffee, she includes a personal reference, asking after the child my partner is expecting, or referencing a news article she read about Facebook because she knows I work for Facebook. In fact, on 4 July, she wishes me happy 4 July, because she knows I'm originally American. She doesn't even offer me a loyalty card, instead she occasionally just gives me a coffee on the house. And most importantly, she knows when not to say anything to me; when she realises I'm busy on a call or running late, or I've just finished my coffee and banana bread and I'm walking out the door, she's not at that moment trying to sell to me anymore.

I buy my coffee and my banana bread from her, and pretty much only from her. And I often grab a sandwich from her at lunch as well. Now, she's running a great business. Not because of the quality of the coffee or just the price, but because of the information she puts to good use with each of her customers and how it makes me feel. Delivering that superb customer experience really is relevant and resonates with my needs.

So, what can we learn from her for a mobile world? When it comes to building your business in a mobile world, this same type of relevance and resonance are the new competitive advantage. Creating value for over one billion people on Facebook on mobile every day through relevance and resonance and doing this at a massive scale, this is what Facebook's DNA is.

My point with the barista example is that we all want to have customers loyally queuing at our doors every day, recommending us to friends and family, generating higher margins. My team, like Facebook teams around the world, work hard to help businesses better understand their customers so they can talk to them in a personal, direct way but at this massive scale that Facebook and Instagram provide, and continue to grow the value they create for real people who come to our platforms every day. So, what we want to do is help you connect to your customers in this personally relevant and resonant way so that ads eventually become just great content and ads become the dirty word that, kind of, they are. Because when you hear the word ad, you go, "Oh, great. I can't wait to watch an ad. That'd be terrific". No, you kind of shudder thinking about ads.

And sometimes we do polls and we do surveys of Facebook users and we'll ask them, "Did you see an ad for a certain brand?" But you know what? Sometimes when the ad is really good and really well targeted and it's really well made for the audience, the people's score on that question actually goes down and the reason is they don't associate that content with being an ad. They just think it's great content that's relevant to their lives. And that's where we want to get to. We call it personalised marketing at scale. It's personalising marketing and your messages but doing it at a scale.

Now, the reality for businesses large and small is that people are connecting on mobile every day, often through Facebook and Instagram and, across some demographics, up to half of all media time spent is on our platforms. We see it in our own behaviours in this room today, through that urge you're feeling right now, you're getting bored with me, you're getting tired, "When's this guy getting off the stage?" You've got that urge to check your phone. That's the thing you're thinking about.

Now, just before I lose you completely, let me reel off a few numbers about what's happening on mobile in Australia to supplement what we heard a little earlier. According to Nielsen, Australians spend 37 hours per person per month on their smart phones. The average is 37 hours and just over 25 hours per person per month on tablet devices. We spend close to 33 hours on Smartphone apps and just over four hours on your Smartphone browser. So, browsing is actually not the common activity on mobile phones. It's working

in apps and Facebook and Instagram are apps. We're the two biggest apps in that ecosystem. So, Facebook, Instagram, video, movies, gaming, messaging, music, travel, finance, news and information, all of these have larger audiences now on Smartphones than on desktops, many by massive margins. And great Australian companies, large and small, are starting to build some amazing businesses on mobile. I can't wait to get more.

Here's some fantastic examples. Tourism Australia. Tourism Australia wants to grow the number of Americans, for example, visiting Australia this year. So, there's over 300 million people in America but for the majority, a trip to Australia simply won't be feasible. They don't have the money, they don't take overseas holidays, they don't have a passport, they don't have enough time. So, Tourism Australia doesn't want to talk to every American, they just want to talk to those who have an inclination to come to Australia that they have a chance to get.

They worked with Facebook to design a series of really cool, immersive, 360 degree videos, the kind of videos where you can move the phone around and explore an environment and those really brought the destinations to life here. So, there were underwater videos where you were diving with seals, there were things where people were standing on the beach at the 12 Apostles, kind of looking around at the scene, just awesome. They were diving on Ningaloo Reef and looking at the coral, just beautiful experiences you could get on mobile with Facebook. And this was designed to pique people's interest, push them to seek out more information, push them down that marketing funnel and get them to go to Australia.com, which is a fantastic mobile enabled site.

Now, what this campaign did, I won't take you into all the numbers about our campaigns, but what it did is it combined Facebook's knowledge of Americans and we used that to Tourism Australia's advantage. So, with our data, we could target people who had passports, who actually did travel and had interesting coastal and aquatic holidays, which is what they featured in their content and we combined that with Tourism Australia's knowledge of what kind of content resonates with the US visitors because they have a lot of knowledge of that.

This proved to be a really powerful combination and it drove outstanding results in terms of intent to visit Australia. Now, although Tourism Australia can't offer that face-to-face interaction and personal experience that I get with my barista and that you probably get with your barista, that doesn't mean they have to blindly blast out advertising messages to more than 300 million Americans hoping to reach the 10 per cent or so who might consider getting on a plane and flying all this way to Australia. They can be smarter and they

can create great relevance and resonance with their intended audience in mobile on Facebook and Instagram. So, they're a great example and then there's a bunch of others as well.

A lot of you will know Domino's Pizza, for example, and Jack Cowin, a great Western Australian for a while, came to Perth from Canada for a long time. Domino's Pizza in Australia is one of the most mobile fast food businesses in the world. It really is an amazing business and if you don't know about it, I urge you to read up some more. They have almost 75 per cent of their orders today coming via mobile phones. They are essentially a technology business and a mobile business that just happens to deliver pizzas. And they utilise Facebook to drive their brand matrix and mobile ordering among really hard to reach customers, which are: young males, college students, uni students, young tradies – those are their core customers. They're really hard to reach through any other media. Facebook and Instagram's the way they do it.

Property site Domain, if anybody's bought a house, you'll know that Domain has a fantastic property app and realestate.com.au has another great app as well. Well, Domain has made its own massive pivot to mobile and their intent is to make Domain the number one mobile property site in Australia and they work closely with Facebook to create really highly relevant content targeted at in market homebuyers and some of you might have experienced some of that if you've been buying a house recently going through Domain.

And finally, a much smaller business than these: Kayla Itsines. Now, I don't know how many people in this room have heard of Kayla, but she is an amazing Australian business success story. Kayla is a 24-year-old fitness buff from Adelaide who many of you probably have never heard of. She has built her brand into the largest fitness personality in the world on Instagram, with over 10 million followers and she also has thousands of paying customers for her fitness programs from around the globe. Many Australians have never heard of Kayla. She is a massive personality in business on Instagram. Kayla has built a multimillion-dollar global business from sleepy little Adelaide, 100 per cent on Facebook and Instagram, and 100 per cent on mobile. Many of you in this room are going to have your own examples that you heard of or that you've seen, but Australia needs many more.

I'd like to highlight one more thing before I conclude, and this is about mobile and this is one word: video. The percentage of video viewership on mobile has gone from less than one per cent in 2008, to over 53 per cent today. The amount of video being viewed on mobile has just exploded. Over half of video being viewed digitally is happening over mobile. Think about your own behaviours and the amount of video that you see in your Newsfeed every day.

This is a huge opportunity for businesses to engage these people as they go about their day on the bus, waiting in the queue, at work, at home, anywhere, everywhere, all day, every day. Video is a place where you have to go if your brand wants to reach consumers.

Now, I'm not throwing around all these numbers just to impress you. My reason is pretty clear. All of us as decision makers, not just digital or mobile marketers, all of us as business decision makers need to start viewing consumers through their mobile behaviours. My CEO, Mark Zuckerberg, did just that. Back in 2012, just four years ago, Smartphone sales were exploding and Mark realised that we needed to do two things at Facebook and we needed to do them incredibly fast. First, we needed to pivot the Facebook experience from desktop over to mobile and we needed to find a way to make ads engaging and relevant in this new Facebook mobile experience. We had two jobs to do at once. If you remember the old Facebook, it was very desktop and it was very text based. It was a very different experience to what you have on mobile today. So, we needed to do both these things at once, switch the experience over to mobile, keep users engaged and then find a way to serve ads in that platform where users are going to find them engaging and not be turned off. If we failed at either of these tasks, Facebook would vanish.

So far, fingers crossed, things have gone fairly well against both of these challenges. As I mentioned, since 2012, Facebook has grown its community to 1.7 billion globally, with over one billion coming to Facebook on mobile every single day. In 2012, Facebook derived zero ad revenue from mobile. Nothing. Just four years ago. Today, in the quarter just passed, Facebook's mobile ad revenue reached $5.2 billion, which was up 81 per cent year over year. That was up from just zero four years ago. Mobile is now a staggering 84 per cent of Facebook's total ad revenue. By almost any measure, Facebook has become perhaps the most mobile business on earth.

Now, I'm sure most of you sympathise with John Wanamaker's quote: "Half the money I spend on advertising is wasted. The trouble is, I just don't know which half." And by coincidence, Facebook's office in New York is actually in John Wanamaker's old office building. He was a big department store owner in New York back in the 19th century. But the truth is that now, with the power of unique identity on mobile and through Facebook and Instagram, these valuable dollars need not be wasted by businesses. You can provide that same personal service and breed the same loyalty at scale as my barista.

So, what should you, as a business leader, do now? This all sounds great, but what are the things you need to take back to the office? So, if I may, I'm going to give a few hard words of advice. Don't wait for others to prove to you that

mobile works. I get a lot of that in my work: "Prove to me that it works before I invest". You need to prove it to yourself. Trust me. Your customers are on mobile. You need to go out and find them.

Challenge how you structure your marketing and your management teams. Don't silo mobile or social into some small group over in the corner of your thinking. Mobile should be at the core of your business and your marketing strategies. Don't treat mobile as a separate customer experience. It's not. Think of it as a totally connected customer journey.

Ask hard, hard questions about how you're measuring the impact of your marketing. Measurement is your most important tool and the key to driving ROI and value in a mobile world. You have to master it. Don't accept that you can waste half of your advertising dollars, because you don't have to anymore.

Resist the temptation to build apps and websites, which few people want to visit. Instead, leverage the platforms where your customers are already spending their time. Humbly, I think these are Facebook and Instagram. Ask hard questions about how you can get more out of your consumer data. Build better customer databases designed with mobile in mind and spend time truly getting to grips with how your customers experience their world. Don't assume you know. Get onto Facebook and Instagram. Get onto mobile. Talk to others. Walk in your customers' shoes.

Challenge legacy strategies and tools that were built in the old non-mobile world. For example, if you're still printing those paper catalogues and shoving them in letterboxes and they wind up in the rubbish, think hard about how Facebook or Instagram on mobile could be your new delivery engine instead. And finally, build deep expertise in your organisations by hiring people who know mobile, including at board and senior executive levels; perhaps most importantly at board and senior executive levels.
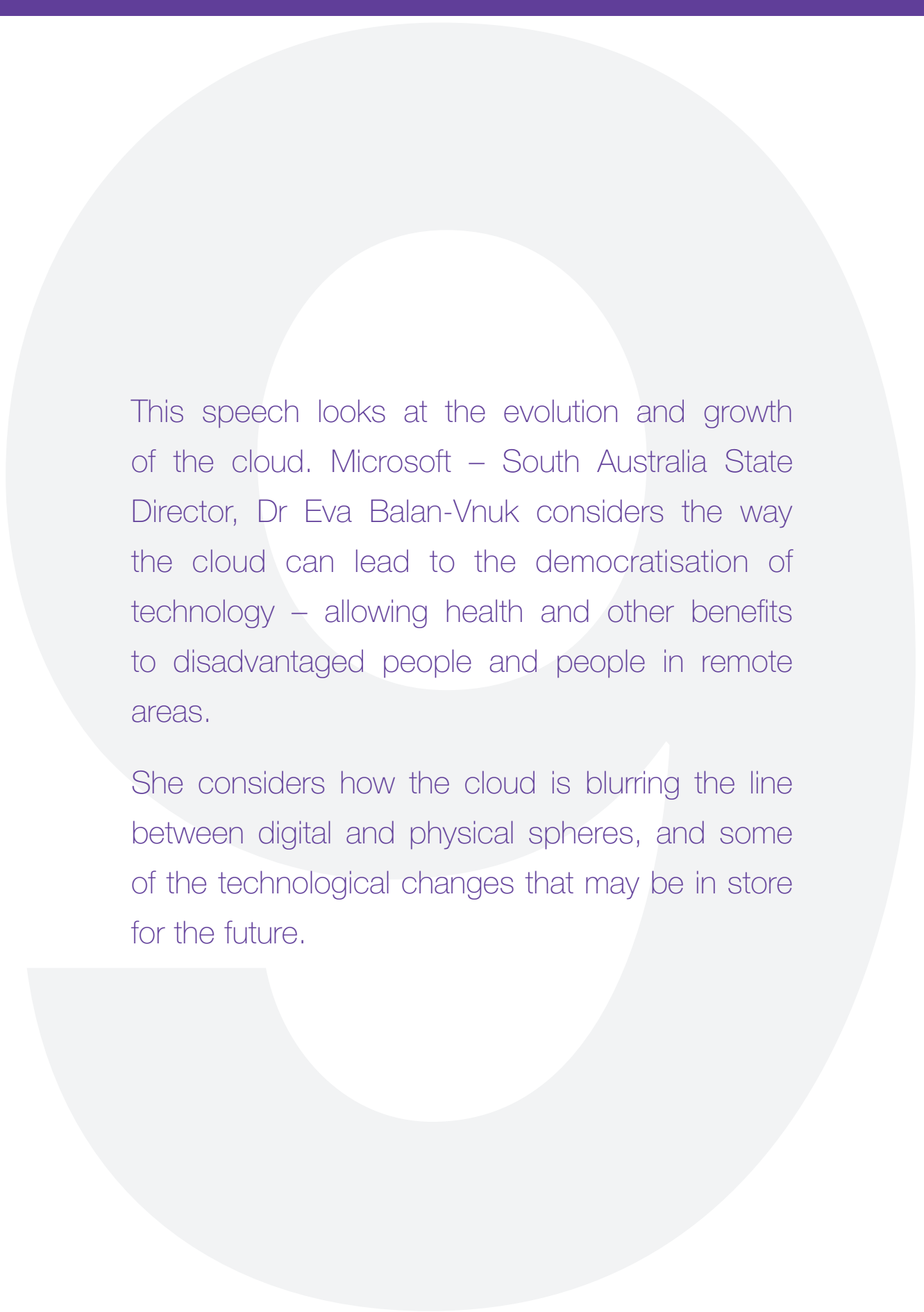
So, next time you pick up that cup of coffee from your barista, ask yourself, "Why am I buying it from this particular cafe?" And then, when you pull out your phone, one of the many, many times that you're going to do so that day, give some thought to the millions of Australians and the over one billion people who are doing the very same thing at that very same moment. And consider how you can build your next million or billion dollar business through capturing these super valuable slivers of attention which mobile presents to the businesses of Australia and to the world.

9

The cloud: understanding opportunities and challenges

Dr Eva Balan-Vnuk

State Director, Microsoft – South Australia

This speech looks at the evolution and growth of the cloud. Microsoft – South Australia State Director, Dr Eva Balan-Vnuk considers the way the cloud can lead to the democratisation of technology – allowing health and other benefits to disadvantaged people and people in remote areas.

She considers how the cloud is blurring the line between digital and physical spheres, and some of the technological changes that may be in store for the future.

The conversation I'd like to have with you this morning is around, "What is the cloud?" but more importantly, "What is the potential of the cloud to power your business, and what innovation is available to you?"

I'd like to take you back about 150 years, to the invention of the steam loco-motive. And you can imagine that back in the 1860s people were used to horse drawn carts, horse drawn carriages, it was nice and quiet, things moved at a certain pace. And then all of a sudden you had these upstarts with brand new technology that was quite frankly loud, scary and sometimes exploded. So quite dangerous, and people didn't understand this new technology – they didn't understand how steam worked – and so they were incredibly scared and incredibly nervous.

I'm not sure how many of you are aware of the *Red Flag Act* that was passed in 1865. The most intriguing aspect of that Act was the fact that someone had to walk 60 yards in front of a locomotive with a red flag to warn everyone that it was coming. Now, I think sometimes we might be a little bit like those folks who saw the first steam locomotive when we come across the cloud. What is it? We don't understand it. Is it scary? How will it help me?

If we fast forward about 150 years, we see these beautiful new driverless cars that, quite frankly, we would like to drive in. And the reason I think that driver-less cars are so incredibly important is because the car will be able to brake and react faster than any one of us in the room can. And how does that work? That works through the hundreds of sensors that are placed on that car, the tyres, the body of it, the testing of what surface is that car driving on? Is it bitumen, gravel, sand, is it wet, is it dry, is there an oil slick? What objects are around that car? Are they stationary, are they moving? Are they moving towards the vehicle? And it will react as it needs to in order to keep us safe.

But not only that, this data is being sent up to the cloud. It's being aggre-gated, analysed, dissected and the learnings are being sent back to every single other driverless car so that everyone can benefit from the same learn-ings to be safe. My two girls are eight and six, and I'm pretty sure they'll still get their driver's licence. Probably in not much longer than that we'll be driving for fun, taking the car out for a spin, because these cars will actually keep us safer and get us places we need to go in a much more effective manner.

But not everyone has the luxury of having a Tesla, or a beautiful driverless car, for that matter. I'd like to take you to somewhere very different, to a woman in a Sudanese refugee camp carrying a very heavy load of sticks, who is quite obviously pregnant. Now unfortunately this is a scene we'd see in many parts around the world including in Australia. People who have no access to education, to healthcare, to sanitised water; they are at a real disadvantage, and their lives could be at risk.

Two medical students came across some really important information. Maternal anaemia accounts for 20 per cent of maternal deaths globally. And that, in stark figures, is around 115,000 women every year dying from what is actually a preventable disease or condition. And these two students didn't stop there. Of course the most reliable way to test, "Have I got anaemia or not?" is through a blood test. But if you can't do that, apparently the colour of the inside of your eyelid will give a pretty good indication as to whether you might be anaemic.

And so these two students – not fazed by what's happening with, "How do I access technology?" – built a solution on the cloud. In fact, they built a selfie app. They built an app where you hold on to your eyelid and with the right lighting conditions, you take a photo of the inside of your eyelid. It gets sent up to the cloud, it gets analysed, aggregated, and then results will come back to you and say what the probability is that you're anaemic. Now, imagine you're up in the Coober Pedy, APY lands, you're pregnant, your nearest doctor is a few hundred kilometres away. You'd want to be able to tell pretty quickly if you're anaemic and you need some medical assistance.

So these two students from Melbourne won Microsoft's global Imagine Cup Competition, which is about young people solving solutions of the world using technology. They spent time with Bill Gates and Satya Nadella and they're well on their way to commercialising that application. So this is really what the power of the cloud is. It's the democratisation of technology. You don't have to be a BHP or an FBI or a NASA to access really complex sophisticated technology. You can now access the bits you need to solve the problems that you're interested in solving.

The Fourth Industrial Revolution is incredibly topical. I would direct you to read an article by Klaus Schwab, who's one of the co-founders of the World Economic Forum, who really defines the fourth industrial revolution as this blurring between the digital and the physical spheres. I'm not wearing one, but has someone got a Fitbit on, Garmin, Health Band? We're using these devices now; it's testing our heart rate, did I sleep well, am I getting enough exercise? If it's not already, it's being connected to health insurance providers.

Maybe they'll give me a rebate because I exercise every day. And so all of this information about our physical condition is now being sent up to the cloud so we can learn from it.

But there are some other really fundamental changes that are happening in this period. It used to take a company around 20 years to reach $1 billion in market valuation. Think about Snapchat and Airbnb; it took them two to three years respectively to reach $1 billion dollars' worth of valuation. I can promise you they didn't do it by signing up and by building on-premises infrastructure. They leveraged the power of the cloud to build a truly global innovative solution that solves major challenges.

Let's refer to a pyramid, a model you're all familiar with: Maslow's Hierarchy of Needs. It's from humanistic psychology and really saying, look, for us to evolve as people, as humans, we need to get the basics right. The basics are food and shelter. Then once I got that I feel secure, I've got a safe place to be. Then I have friends, family, I have intimacy in my life. At that point I'm confident, I've got self-esteem, people respect me. And at that point I can really realise my own full potential. So I'd like to compare that as a framework for thinking about what the cloud can deliver for you and your organisation.

So the very first layer, and this is not discounting the fact that many organisations have on-premises infrastructure, and likely that's going to have to stay. You've got mainframes, there is old legacy technology that needs to stay where it is, and that's fine. But there are certainly new ways to take advantage of what the cloud is doing.

The first layer, which is Infrastructure as a Service, we kind of like to call the plumbing. That's the servers, it's making sure you've got geo-redundancy, you've got the patching in place, that the system and the environment itself is healthy and operating successfully. For many people this is the first step; they're taking the infrastructure they've got on-premises or with a hosting provider and they're moving it to a cloud that's global and scalable. But it doesn't stop there.

The next one is Platform as a Service. One of the Chief Information Officers I work with in the SA government, he pretty much said, "Look, I've got a great information technology (IT) team – fabulous. But they're busy running IT. I want them to deliver business value. I don't want them patching servers. I want them working on the business applications that deliver value to our internal stakeholders and to our citizens and our customers". So Platform as a Service is really saying, "Someone else takes care of all of the plumbing. I just need it to work, and I build my intellectual property (IP) and my value on top of that".

Now, getting to Software as a Service, who's using Twitter, LinkedIn, Hotmail, Gmail? Everyone. That software is a service. It's there. You sign in, you log in, you use it for what you need to and then you sign out again. And now this is a really interesting point. If you think about the two medical students, their product's called Eyenaemia. That is Software as a Service. They can make that globally available to anyone and they can earn some money from it. Equally established businesses now, you would consume Software as a Service for a customer relationship management solution, or for a productivity and collaboration platform. But equally you can develop services that you can sell and thus create a new business model for your organisation.

Now, where I think it gets really exciting, is when we start talking about things like machine learning and artificial intelligence (AI). What's really important about all these things? This is about the commoditisation of data science. This doesn't mean we don't need data scientists. We desperately need more data scientists. But what we then need these people to do is to build value on top of a template. Why start from scratch if you need to build a fraud detection system? Take a template that exists and customise it with your domain knowledge and expertise, and tailor that for your internal organisation. Your time to value is incredibly fast, because you're not starting from scratch. All of the grunt work has been done. You tailor and customise.

There's an amazing lot of data we're getting; data could be seen as the new oil in terms of an unlimited resource. It's how we harness it, and how we use it to glean insights that otherwise we'd have no idea even exist. And the part I guess I get most excited about is artificial intelligence. And this is where you start to see really interesting things such as conversation as a platform.

What does that mean? Say I've got a claim; I don't want to get on the phone to talk through it because I know I'm going to be on hold for about an hour or two or three. Instead I go to the company's website. There's a little bot there that says "chat". I start to have a conversation. That's not a person sitting there, that's artificial intelligence learning what the intent is behind the questions that people are posing, and responding and trying to probe to give me the information that I need in response. We're going to see more and more of this, and there are some amazing new APIs and ways of testing and experimenting. And this is true democratisation of technology. You don't need to be a big player to access this technology and build the billion-dollar data centres. Anyone, students, start-ups, existing businesses, everyone can test this and try it out and see how it works.

So hopefully that gives you a framework of how we see the evolution and the growth of the cloud, and I'm sure there will be more things above that that we haven't even invented yet.

What does this mean for business leaders? If we boil it down to real essentials, the business leader is there to grow profit for the organisation, to retain and grow shareholder value, and if you're a government agency, it's about delivering effective and efficient customer and citizen services. How do you do that? With the speed of change that we're in at the moment, you need to really be very proactive and agile in grasping the opportunities the cloud presents to you.

I'd like to share an example of how some organisations are creating that petri dish of experimentation within their organisation. I think many of you would know Zara, the fashion house. Their manufacturing line runs at 75 per cent capacity. And you might say, "Well, that's corporate suicide. Why only run at 75 per cent?" There's method behind their madness.

When I go into their store, there are video cameras tracking what I'm doing. They're watching what I look at. They're watching what clothes I take off the hanger and what clothes I put back. When I walk into the change rooms, what clothes do I choose not to buy? And you know what, the staff are trained to ask me, and I say, "Well, I didn't like the jacket, the way the lapel sat, the colour wasn't quite right". They will go back and actually redevelop and redesign their clothes on a four weekly cycle so that they're much more closely attuned to what their customers want. And in this way 75 per cent capacity is perfect, because it gives them that room and that flexibility to be agile and to meet the needs of the customers that they want.

And what about our people? It's challenging in a very, very fast moving time. Our lives, personal and professional, are blurring incredibly. I don't know how many of you check your phone in the morning for email, check it late at night for email, and maybe in the day you're doing something personal. Our lives are really blending together. And so how do we help our people make sure that they don't get lost in this cacophony?

Some of our colleagues out there in the IT space are quite nervous because in reality this means a ton of change for the way that they operate and the way they deliver services and value back to the business.

So I would like to do a very shameless plug for one of our start-ups in Adelaide called Teamgage. They work with us through the Microsoft Innovation Centre. The team was founded by some people who worked in some incredibly toxic teams. And it was a miserable work environment. And we all know the story,

DR EVA BALAN-VNUK

people join companies and they leave managers. And their premise was, "Well hang on, surely if the manager knew or the team leader knew how toxic the environment was, they could have done something about it".

And so they've created this amazing 20 second survey. And it truly only takes 20 seconds, we're piloting it in the Adelaide office, for the team to give feedback. A dashboard gives me colour charts to see "How is my team feeling?" We take this to our branch meetings and we discuss as a team what the challenges are. What do we need to change? What do we need to address and do differently?

So this is an amazing organisation, Teamgage, building an incredible solution, Software as a Service, on a platform where they don't care what the infrastructure is. They only care about being able to develop their application to serve customers around the world, not just in Adelaide.

So we are riding this incredible wave of opportunity. There's a ton of change. And some organisations are going to coast along the crest of that wave to amazing success. And some others are not going to make it. We all know the Kodak example. They didn't make it because they didn't innovate, they didn't challenge themselves, they didn't disrupt themselves and say, "Someone else is going to cannibalise my business, well, I'd better do it first, otherwise I'm totally out of business".

So as business leaders, as new business leaders and students, really the onus is actually on you to experiment and to try and see how can you take advantage of these technologies for your own business benefit by delivering profit, shareholder value, and great citizen services that we all expect from our government.

Thinking long-term: can industry seize the innovation opportunity?

Christine Holgate

Chief Executive Officer and Managing Director, Blackmores

This speech is taken from comments given by Blackmores Chief Executive Officer and Managing Director, Christine Holgate as part of a discussion panel titled: *Thinking long-term: can industry seize the innovation opportunity?*

Ms Holgate looks at opportunities to explore international markets through the use of digital technologies and social media. She also looks at innovation more broadly, discussing impediments to innovation, such as risk-averse boards, as well as how Australians should view innovation in a global sense.

So often when people talk about innovation they think it's some new product, or new technological advancement. For me, innovation can be very broad ranging. It's about doing things differently inside your organisation. I personally think the people at the real coal-face of the organisation, often have the best ideas. So by talking to your employees, or talking to your customers, you have a much better chance as an industry to really understand what innovation can do.

I think there's an opportunity to invest more generally in innovation. Investing in intellectual-based capital is just like investing in anything else – it doesn't always pay off. You see, for every great 10 ideas, only one or two are going to get up. You don't just need a return from that one or two ideas, you have to consider covering the cost of the ones that don't work. So you need super-returns.

I went to Israel last year and I could have kicked myself that I hadn't been earlier in my life. What a fabulous country: no natural resources, but abundant intellectual based capital. And it's a really great reminder what brilliant things can happen if that's what you invest in.

Australia has industries like health, food, education, financial services – not even taking into account our resources – where we are known to be the best in the world. We have the highest quality, the highest standards. I'm extremely passionate about trying to encourage Australian companies to embrace and grow, not just in the Association of Southeast Asian Nations (ASEAN), but in Asia more broadly. Thirty-five per cent of global growth is coming from China at the moment. Indonesia is forecast to be the third biggest economy in the world by the year 2030. And yet as a country, we're investing more money in New Zealand in 2015 than we're investing in Asia. Why would you do that? Why would you do that when the Australian and New Zealand economy only adds up to about two per cent of the world's economy, and when the other 98 per cent is available to be cultivated?

And to get super-returns, can I suggest, as much as I love this country, why would we not go just up the road to Asia? And you know, we are so lucky. Now is the time to do it. Because the advances in technology are enabling smaller companies in Australia to really go and take it via social media.

Can I give an example? Blackmores ran a social media campaign on WeChat. If you aren't familiar with WeChat, it's how the Chinese communicate; they don't use Facebook, they use WeChat. We approached Li Na, the world's number two women's tennis player, to support a charity event. We were trying to raise awareness of congenital heart disease in China with children, and we

asked Li Na to do it. I believe we just recorded her in our own office, off the back of someone's own camera. No big expense. We asked people to log on, hook their mobile phones on to our WeChat account, and to track their steps. And for so many steps we'd give money to the charity. Within days we had five million hashtags, 800,000 people had logged on, and 25 million steps had been tracked. We just could not believe it.

But you see, that is an example of how small Australian companies can really exploit this wonderful opportunity and get their message out. You no longer have to spend millions to do it, so I think, if you do not go and grab hold of ASEAN: beware. Because the Germans are – and I hate saying that because I love Germany too – 23 per cent of capital investment going into Indonesia is coming from Europe.

One of the learnings that I've experienced is that when change happens, or you're trying to push for something like moving into China, and regulation evolves, it can be seen as risky. I think what you have to do is try and educate the shareholders in the market – I don't mean that in a patronising way. But we need to set milestones other than financial, and try and bring our shareholders on the journey.

There are many ways to measure success, and they're not just financial. I'll give you an example. When I went to Blackmores's Chairman of the Board Marcus Blackmore and said, "Marcus, I want to spend all this money in Asia, and try and turn it around, even though generally we aren't making any profits there, and despite the fact we've already been there for 35 years. And I'm not sure when you're going to see your cash back. I just know we need to do it."

That was my business case. Why? Because we needed to build a natural hedge in the business, because our raw materials came from overseas, we needed to have diversification of risk, and so I talked through the other strategic reasons. Generally, Marcus says a business plan is out of date the day the board has signed it off. Which is true, isn't it? It's like budgets, budgets change the very next day and you've got a different view. So I think we need to think differently about financial hurdles and how we invest in innovation and opportunities. It's not just financial, there are very many different other ways to think about it.

Having said that, quarterly reporting does serve a purpose. We do quarterly reporting. However, there's nothing more short-term than that; and through quarterly reporting we're forcing boards and investors to just measure us with financial results. It requires the board to back CEOs. The benefit Blackmores has is Marcus's name is on the door, and we have a strong board, and that does enable us to be long term.

Continuous disclosure does have its benefits. At Blackmores, we're never worried about public speaking because we're constantly telling the market how we're going. Seventy per cent of our shareholder base are retail shareholders, they're mums and dads, and a large proportion of those have held us for more than 25 years. So our shareholders are actually pretty long-term thinking.

Now we've gone into the ASX100 we have quantitative funds holding us, who never want to meet us, are uninterested in strategy, and it's just some statistical analysis of what's happening – whether they buy or sell your shares. So that goes completely against the spirit of investing for the long-term. And I think that's where you get the issues. So, personally, every time we do quarterly reporting I say "I wish we didn't do this", but if I was a shareholder, I would want to know what's happening and feel informed. I think when you keep people informed you actually win their confidence through bad times as well as good.

Look, I clearly don't think Australian business are doing enough to innovate. But it's not just because the CEOs or the boards don't want to, it's because of a set of circumstance. If you go to the bank and say "I'd like to build a facility down in Adelaide, can you lend me $10 million?" they will say, "Sure", and just give you whatever your margin rate is over cash. Conversely, if you say "I'd like to spend $10 million building a business in China," they are likely to say "Sure, that's three times your normal rate."

So to start off with the banks, they generally make it more expensive for overseas investments, they put that hurdle in because they say it's higher risk. (Potentially it is higher risk, but I would suggest it's higher risk if you don't do it.)

But saying all that I think the free trade agreements with the government are a really positive sign and a really good first step, and I'm really encouraged that Federal Minister for Trade, Tourism and Investment, the Hon. Steve Ciobo is going to take on the great work of former Federal Trade Minister, the Hon. Andrew Robb AO and carry on with them. It's not really the tariffs that are the issue, they are a big impediment, but they're not the issue. For us, for example, in food and health, it's actually the ingredient strategies and the regulation when you go into a country. So for China I really want to see a recognition of our standards here in Australia, which are the highest in the world. And if we have recognition of them we would be able to take more products in.

China is booming because of the free trade zones. But really to serve a world market you need to be in the broader retail market, and that requires another level. The free trade agreements are just the first step. We now need to free up regulatory barriers.

The Government can do one thing to help – well, they can do lots of things – but they can do one thing in particular: you ask a lot of small Australian businesses, "Why aren't you embracing ASEAN or Asia?" They'll often say "Because there are so many risks" or "We don't understand" or "We don't have the skills", the language barrier puts off a lot of people. We have hundreds of thousands of students right now living in Australia, what I would love to see, is the government changing the rules on the number of hours these Asian students can work in our society. Legitimately, they're only allowed to work 10 hours a week, and so what happens is they can't get meaningful work. So they end up working as waiters and waitresses, and whether we like this or not, so often not being paid the correct wage, working more than their 10 hours and being employed illegally.

I say this because I have first-hand experience on how great these students – we took in a foreign student at Blackmores with the help of Sydney University, a young law student from Korea. He helped Blackmores launch in Korea, and he's now our junior lawyer. So as you can see, there's this wonderful resource not being utilised. While legally students can stay on for a year after graduation, this clause is actually not good enough, because these students need to go back to their families and they haven't got the money for that luxury – and if they're being sponsored in any way then those businesses want them back. But while they're here, let's have them doing meaningful work. It's good for them, it's good for their countries, but selfishly, it's good for our business.

In terms of waiting on government for policy changes to encourage better regulation, we have a culture of knocking off politicians as soon as they get voted in. Maybe we need to support our politicians and it's us as voters who are a part of the issue. We should respect the people that are voted in, respect the people's choice in voting them in, and get behind them and help them be successful. We need a long-term government.

Acknowledgements

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Business Events Sydney

Business SA

Cabrini Health

Capgemini Australia

Cardno

CBH Group

CBRE

CFC Group

Charles Darwin University

Chartered Accountants Australia and New Zealand

Chase Performance

Chevron Australia

Citipower and Powercor Australia

City of Ballarat

City of Casey

City of Gold Coast

City of Greater Dandenong

City of Greater Geelong

City of Parramatta

Clayton Utz

COAG Reform Council

Coal Services

Coffey International

Coles Group

Colin Biggers & Paisley

Commonwealth Bank of Australia

Complementary Healthcare Council of Australia

Comscentre

Comunet

ConocoPhillips

Consulate-General of Canada

Coopers Brewery

CPA Australia

CPB Contractors

CSC

CSL

Curtin University

Deakin University

Defence Housing Australia

Deloitte

Dimension Data

DLA Piper

DORIC Group

DSD

DuPont

Dynamiq

Edith Cowan University

ElectraNet

Empired

Energy Safe Victoria

EnergyAustralia

Engineers Australia

Ergon Energy

ESRI Australia

Essential Services Commission of SA

Export Finance and Insurance Corporation

ExxonMobil

EY

Federal Department of Education
and Training

Federal Department of Immigration
and Border Protection

Financial Services Council

Finlaysons

Fisher Jeffries

FleetPartners

Flinders University

Folk

Fortescue Metals Group

Fragomen

FYFE

G4S Australia and New Zealand

Gartner Asia Pacific

Gascoyne Development Commission

GE Australia

Georgiou Group

GHD

Gilbert + Tobin

GlaxoSmithKline

Greater Shepparton City Council

Griffith University

HASSELL

Health Partners

Healthways Australia

Henry Davis York

Herbert Smith Freehills

HESTA

Homesafe Solutions

Hong Kong Economic and Trade Office

Hood Sweeney

Horizon Power

Hunter Water Corporation

Hydro Tasmania

IBM

IFM Investors

Illuminati Consulting SA

Infrastructure Australia

INPEX

Investec Bank (Australia) Limited

Ipswich City Council

Jackson McDonald

Jacobs

James Cook University

Jemena

John Holland

Johnson & Johnson

K&L Gates

Kelly and Co Lawyers	Melbourne Water Corporation
Kimberley Development Commission	Metro Trains Melbourne
KinCare	Microsoft
King & Wood Mallesons	Mid West Development Commission
KJA	Milwaukee Tools Australia
Kojo Group	MinterEllison
KPMG	Mitsubishi Australia
La Trobe University	Monsanto
LandCorp	Morgan Wealth Management Group
Lander and Rogers Lawyers	Motor Accident Commission
Latrobe City Council	Murdoch University
Lavan Legal	MWH
Leaders Institute of South Australia	MyState
Lean Construction Institute Australasia	National Australia Bank
Leighton Holdings	National Water Commission
Lendlease	Navitas
Litmus Group	NGIS Australia
Local Government Association of Queensland	Norton Rose Fulbright
Logan City Council	Nous Group
Macquarie Group	NSW Department of Industry
Macquarie University	NT Department of Business
Maddocks	NT Department of Education
ManpowerGroup Australia	NT News
Marchment Hill Consulting	OnTalent
McConnell Dowell	Oracle
McCullough Robertson Lawyers	Origin Energy
McKinsey & Company	Parks Victoria
McRae Clough Pty Ltd	Pawsey Supercomputing Centre
McRae Investments	People's Choice Credit Union
Medibank	Perpetual
Melbourne Airport	Perth Airport
	Philips Electronics

Pilbara Development Commission

Pitcher Partners

Pitt & Sherry

Places Victoria

Plenary Group

Port Authority of New South Wales

Port of Brisbane

Pottinger

Powell Tate

Pritchard Francis

Professional Public Relations (PPR)

Programmed Group

PwC Australia

Queensland Airports Limited

Queensland Department of
State Development

Queensland State Government

QUT

RAA of SA

RAC of WA

Regional Development Australia Hunter

Regional Development Australia Tasmania

Resource Partners International

RiAus

Rio Tinto

RMIT University

Robert Walters

RPS

RSM

SA Department for Manufacturing,
Innovation, Trade, Resources and Energy

SA Department of Environment, Water
and Natural Resources

SA Department of Health

SA Department of Premier and Cabinet

SA Department of State Development

SA Department of the Premier and
Cabinet

SA Equal Opportunity Commission

SA Power Networks

Sala Festival

Santos

SAP Australia

Scope Global

SEEK

Serco

Shell Australia

Siemens

SMS Management and Technology

South Australian Water Corporation

South West Development Commission

Spiire

Spotless

Standard & Poor's

State Revenue Office

Stellar Asia Pacific

Stirling Advisory

Stockland

Sun Metals Corporation

Surveyors Board of SA

Swinburne University of Technology

Sydney Airport

Sydney Water

Synergy

TAFE NSW Strategy

TAFE SA

Tasmanian Department of Premier and Cabinet

Tasmanian Department of State Growth

TBH

TCS - Tata Consultancy Services

Telstra

The Chamber of Minerals and Energy of Western Australia

The GPT Group

Thiess

Thomson Geer

Three Plus

Toowoomba Regional Council

Townsville City Council

Townsville Enterprise

Transdev

TransGrid

Transurban

TressCox Lawyers

TRILITY

UniSuper

University of Adelaide

University of Melbourne

University of Newcastle

University of Queensland

University of South Australia

University of Southern Queensland

University of Sydney

University of Tasmania

University of Technology Sydney

University of Western Australia

University of Western Australia, Business School

VETASSESS

VicHealth

Victoria State Government

Victoria University

Victorian Department of Economic Development, Jobs, Transport and Resources

Victorian Department of Environment, Land, Water and Planning

Victorian Department of State Development, Business and Innovation

WA Department of Agriculture and Food

WA Department of Local Government and Communities

WA Department of Regional Development

WA Department of Water

WA Super

Water Corporation

Wesfarmers

Western Power

Western Sydney University

Westpac

Wingate Properties

Woodside Energy

Workskil Australia

WorleyParsons

WSP | Parsons Brinckerhoff

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