The Past and Future of Australian Innovations in Information and Communication Technology (ICT)

Oral History Interview

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Helen Meredith

Interviewed by:

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Interviewed on:

Wednesday 21 October 2020

Citation: Boell, S.K.; Philipson, G.; Thorne, P.; Riemer, K.; Peter, S.; Wang, B. (2023). Series of Oral Histories with Pearcey Medallists and Hall of Fame 2000-2020. Sydney, Melbourne. DOI: doi.org/10.25910/j5ak-rs49

Project Summary

This interview is part of a series of oral history interviews undertaken by the Pearcey Foundation and the University of Sydney as part of the project 'The Past and Future of Australian Innovations in Information and Communication Technology (ICT)'. The series interviewed recipients admitted into the Pearcey Hall of Fame from 2003 to 2020. The hall of fame recognizes outstanding life-time contribution to ICT in Australia in business, research and government. Each oral history captures a short biography of individuals who made an outstanding contribution to ICT in Australia. They also collect insights on aspects that had a lasting effect on ICT innovations in Australia, positive as well as negative from approximately the 1960s to the 2010s. Interviews lasted about 60-90 minutes and were conducted by Sebastian Boell, Graeme Philipson, Peter Thorne, Kai Riemer, Sandra Peter and Belinda Wang. The complete set of interviews in this series is archived by the Pearcey Foundation.

Key Points Covered in this Oral History

1. The government are not competent to make sound policies for R&D funding schemes, except for Jones and Button's policies in Labour's term. However, this policy didn't last long, so it was not effective in penetrating the innovative culture into the whole industry.

2. University and Industries could join forces to reduce the silos of knowledge, by tailoring the curricula and matching degrees to the industry's needs at the time. In this way, the industry can offer internships to further develop the expertise of graduates in the field, which can be one effective solution, e.g. AITEC scheme in SA.

3. Leveraging the innovations in Australia's leading industries (mining, agriculture and tourism) and crossover such advantages to the IT innovations can be a good strategy for building a strong position internationally, such as Mincom as an example to extend its use in railways in the US.

Biography

Helen Meredith

Former Contributing Journalist of AFR, SMH, The Age
Former Editor for The Australian
Pearcey Hall of Fame in 2017

Journalist, Editor, Commentator

Helen Meredith has been a national figure as a commentator and reporter on the Australian, and the international, ICT scene for over 40 years. The list of media organisations she has worked with includes *Pacific Computer Weekly* where she was News Editor from 1980 to 1982, *The Australian* as Computer and High Technology Editor from 1983 -1993, and the *Australian Financial Review* (1993 -2002).

She has also been a contributing journalist to the ABC, *The Financial Times*, *The Sydney Morning Herald* and *The Age*. Between 1996 and 2002, Helen was Editor-in-Chief of the *Global Flow* international web news service.

In 2002 Helen Meredith was the recipient of the prestigious Kester Award for lifetime achievement in technology journalism.

In addition to her role as a journalist and commentator, Helen has participated in addressing the public policy issues arising from the Information Revolution.

Her focus has been strongly on STEM and the role of females in STEM.

In 1989, Helen was involved in the establishment of Females in Technology (now known as Females in Information Technology and Telecommunications), the forerunner of a national network of similar associations aimed at inspiring women to achieve their potential at all levels and disciplines within ICT, by providing support and facilitating peer networking.

Helen edited the notable 1993 publication *"Women in Technology"* for the National Information Technology Council and was the author of "*Easy Riding on the Information Highway".*

Interview Transcript

Date of interview: Wednesday 23 September 2020

Could you briefly summarize your biography, where did you grow up, what was your education, and what were the different names and years of the different organizations you worked for?

Well, I think you should have my CV in front of you there somewhere. As far as my background is concerned, I grew up as a country kid to parents who'd come out of the First World War, the Depression, then the Second World War. So I was a child of that generation. My education was mostly in Queensland. After year 12 I wanted to take a cadetship at the Courier Mail but my parents insisted I enrol in UQ. I dropped out after becoming a single mother, then had a further three children, during which time I went back to university, taking subjects that skilled me for work as a science editor. I tutored in Communications in Science in the School of Applied Science at Canberra CAE (now University of Canberra) while employed full-time as publications editor at the National Capital Development Commission. I was increasingly drawn to the emerging digital sector but was of necessity an autodidact while supporting four children through school and to university. I was in my mid-to-late-thirties before I became fully involved as a journalist/editor on a newspaper.

That's a lovely word, autodidact.

Well, I had to teach myself basically. Don't worry about the dictionary, that's all it means.

Great word.

When did you start reporting on IT Helen?

I was attracted to technology during the 1970s but was more interested in writing about it than in being part of it professionally. And I was fortunate in having as my mentor, Ernest Kozcar, a science and technology journalist who, having survived both the Nazi and Soviet occupations, had migrated to Australia at the time of the 1956 Hungarian revolution. We had become acquainted through "The Society of Authors". He was enthusiastic about Australia's potential to be more deeply involved in the digital industry. He predicted there would be an increasing need for journalists to report on this. His advice was to waste no time in guiding my career in that direction.

My work for the National Capital Development Commission proved to be a good training ground for what was to come. It was a multidisciplinary organization that employed engineers' architects, town planners, technologists, social scientists, artists, graphic designers etc. It was my job to write or edit information coming out of their various sections, much of which had to be tabled in parliament. It also included writing NCDC's annual reports and producing various publications for the public such "Works of Art in Canberra" and for local shire councils, such as "Guidelines for Subdivision".

By the late 70s I was still working full-time for the NCDC, teaching at CCAE and doing some freelance science editing. I was also moonlighting as a freelance writer for "Pacific Computer Weekly'n (PCW). When the last of my children had completed Year 12 and entered university I took up PCW's offer of work as News Editor in Sydney and soon after became editor of "Computers and High Technology" on "The Australian". Ernest Kozcar was right. By the early 1980s, the traditional media had got the message and daily newspapers

were starting to treat technology seriously as advertising dollars flowed into their coffers from the industry. Specialized trade papers like "Computer World" and PCW were becoming more prominent. In addition, many new magazines focused on computing were being launched worldwide including in Australia. Consequently, a large cohort of writers emerged, many of them with good technical skills. You'd be able to name of few of them, and you'd also recall there were some writers, like me, who came out of nowhere and turned a pen to the task.

Yeah, it was interesting the different types of people who were computer journalists, there were the journalists who wrote about computers and the computer people who sort of became journalists.
That's right.

Many of whom were very, very good writers.
Yes, I thought so too. Looking back I see some amazing people who were on the job. And we became good colleagues many of us, didn't we?

Well, we had a nice little cohort, late-80s, early-90s, things were comparatively stable and there was a group of about a dozen of us that were sort of the A-league as it were, and we were all very good friends.
That's right, good drinking companions too.

Yes.
What began to interest me also was the infrastructure in which this was now operating. We were observing politicians, the government at the time, trying to get their heads around it, as were governments all over the world. And there were countries during that period that were doing a lot better than Australia. The US of course, Germany with Siemens, Japan with NEC, Hitachi and Fujitsu, Italy's Olivetti and Ericsson in Sweden and more. And they all benefited from government subsidies.

And Helen, you also had the government putting money into ICL in the UK, France putting money into Groupe Bull. And Bull and Olivetti and ICL eventually failed despite all the government support.
They did very well for a while, including Plessey, Cable and Wireless, and others. And governments were increasingly facing the complexities involved in communications between countries and systems. We had complex legal issues to deal with, so that senior people like Michael Kirby became involved in international cross-border data flow. I'm recalling the eras of Barry Jones and John Button, both Federal ministers trying to address the legislative backdrop and political implications of this complex marriage and interdependence of technologies and policies on tariffs and international trade. Jones was exceptional, I think, because he not only understood the politics of it, but also the social aspects. He was deeply concerned about the future of innovation in Australia.

So how effective do you think they were - you were just talking about Button and Jones - and the main government intervention then was the Partnerships for Development Scheme, was that effective do you think?

Well research and development funding and support from government is always a two-sided thing. It depends on what you do with it in the end, because you might just benefit the established, the already incredibly well off, or you might actually start to do something with start-ups and support them right through to commercialization. And I think we were not good at this compared with other countries. When you see what happened in say South Korea, Taiwan and Japan, where they were massively successful and hence the rise of so many brilliant companies like Hitachi, Fujitsu, and NEC.

We lacked the kind of statesmen needed to lead government in this critical period of industrial change, people who understood the need to build an industrial culture of our own, people who were not solely focused on the mere short-term political view of life. The communications and computer industries have depended on research and development funding from government but there has always been conflict over government policy when it comes to issues of ownership and privatization. Building an industrial culture has been a hard struggle for Australia.

Helen, with the benefit of hindsight what do you think, where should this money have gone, or when you said Australia missed the opportunity to invest, where should Australia have invested?

Well, I think government was always conflicted when it came to innovation, unable to make a big enough differentiation between what is home-grown innovation and what we need to import to support our immediate wider industrial needs. Timing is everything of course. We had a flood of very big overseas companies coming in early to exploit our market, a lot of the money ended up flowing to them rather than to breeding our own home-grown technology. I mean that's a layman's view of it, obviously. Ideology can get in the way of innovation. I think someone said the rusted-on belief systems of political parties puts a constant break on the acceptance of new ideas. Our government was trying to cut deals with overseas tech companies, by having them locate research labs here in the belief that offering them concessions would boost local innovation. But my sense is that we gained little from this.

This never, or very seldom, worked out in our favour in the long run. But that was the deal. The leading overseas players had access to research and development funding here, in spite of having significant research and development funding themselves.

When you examined their annual reports you could see they were allocating as much as 10 or 12 per cent of their annual revenue to R&D. When they briefed the press at annual report time, someone would always ask "What did you put into research funding in the last year?" and it was always massive. They were selling into markets worldwide including ours and they had the R&D dollars to keep rolling out the technology.

So what do you think could be done for politicians to better understand what home-grown innovation is and how to support home-grown innovation?

They need to be educated and ethical and hold knowledge in high regard. They need to have a view that takes into account the long pipeline required for complex research and development, so-called patient capital. Instead they tend to think in terms of political terms of

office, say three years, and buying favours that will help them get re-elected. Innovation has always come from those who feel uncomfortable with the status quo and want to improve things. But it requires patience and a safe haven for the research community and those involved in the long process that leads to adoption and commercialization.

So what do you think could be done to help our policy makers and people in government to better understand or to be better educated, you said it's about education, anything…?
Well, you need an educated public to elect our representatives in the first place. You need people to understand how important it is for them to vote correctly. I also remember Barry Jones talking about the fragmentation of knowledge and the importance of having smart people helping the policy makers. So you need a very well educated and ethical public service since a great deal of the responsibility must fall on them. They are sitting right there at the elbow of government. Public money shouldn't be lavished on private consultancies and government should only seek outside service when there is no other recourse. The public service should always be the government's primary source. They should only turn to consultants as an exception. As far as the lobbyists are concerned, they need to be locked out of the parliamentary environs and the number given ready access to government tightly controlled.

The people with the real knowledge must be empowered and respected. and the environment in which they work supported and where possible made flexible enough to allow for collaboration and change. And where possible it should be recognized that knowledge might be shared rather than fragmented as it has been. We have silos of knowledge that don't necessarily collaborate. It doesn't have to be this way. Universities are a case in point. Take Waterloo University in Canada and even Cambridge in the UK where there were levels of collaboration and an ability to spin-off innovative start-ups at the right time. In Australia the big overseas companies controlled much of the game at pivotal early developmental times in Australia and quickly snapped up any useful local innovation and its intellectual property. Don't forget we were living through the Cold War and the US was controlling access to its most valuable technology during that formative time. This slowed down and even killed off initiatives in many other countries too. It made people very cautious. We're not a very bold society anyhow so we have to fight that caution. I don't know, what do you think Graham, am I being too harsh?

I think you are a little, I don't think we're necessarily cautious any more than other people are, but I don't think it's a particularly Australian characteristic, but I certainly think that we're not terribly, not terribly good at thinking outside the square. I think Australia's a very conservative, Australians are very conservative people.
When I was travelling a lot for work, I went to pretty well every big research lab that I could, including: Ericsson in Sweden, Nokia in Finland, Siemens in Germany and Fujitsu in Japan. And of course Bell Labs in the US - just to name a few. And you probably did much the same Graeme.

And the thing that struck me was the cooperative nature of so many. A kind of overarching national intention to support progress. People were talking to each other. There seemed to be a sharing of knowledge. There were universities linked with the research labs, and universities spinning off research into start-ups. We didn't appear to have the same level of cooperation at that time. The Telstra Labs, under Harry Wragge's leadership was one

exception. They were reaching out, offering internships to graduating students. I may be wrong but their relationship with suppliers such as Ericsson appeared to be more mutually respectful. I don't know exactly when this changed but it eventually did, perhaps when Blount took over as Telstra CEO. However I don't remember the details or the politics of the time.

No, I don't either I, we were talking to someone about this only in one of our earlier interviews, I forget who it was now, but we did discuss the demise of Telecom's research labs, and I think, my memory is that our interviewee was of the opinion well we don't need to do our own research anymore because we've just become a commodity company and we can buy all the stuff we need off the shelf as it were.

Sorry go on Helen…

That also brings us to the role of the tech parks in supporting innovation. I was on the board of AITEC which was based in the Adelaide Technology Park. This brought together the Deans of the local universities: Flinders, University of South Australia and University of Adelaide., leading telecommunications expert, Dr Reg Coutts, and the principal of one of the major TAFEs whose name I can't remember. Chairman was Harry Wragge, head of Telstra Labs. The aim was to pluck smart young graduating students out of the universities and offer them the path to Master's degrees that focused on emerging IT and telecoms engineering and provided them with appropriate professional skills. A recent conversation with Harry has reminded me that it was keen to provide external students with an insight into western concepts. AITEC students were guided towards internship with industry including major companies like British Aerospace which had a strong presence in South Australia at the time. The students were also pivotal in an early experiment at AITEC in online/remote lecturing through a bespoke program. It's my understanding that AITEC was unique and very specific to the needs of the industry at the time. Adelaide already had a strong innovative technology sector, with a succession of early stage ventures occupying the tech park, including some with break-through innovation such as Vision Systems. That culture continues today with local Adelaide-based companies such as Cohda Wireless, an international success story.

Yeah, they're Adelaide based, aren't they?

If I had any money I'd invest in it, wonderful.

Talking about tech parks reminds me of Shenzhen in China. It was no more than a village when I went there in 1988 to attend a tech park conference. Now it has a population of 12 million and is a technology power-house.

Yeah, when I first went to Shenzhen I got set up there by somebody and I looked it up on the map and I couldn't find it, my atlas was ten years old and Shenzhen didn't exist ten years earlier.

You were using your old Times atlas, were you?

That's right, an amazing place.

It is indeed an amazing place, an example of what a country can do when it really wants to. And it just flicked back in my mind to how there was a period when we had the opportunity to do something ourselves if we'd had a government which understood how necessary it was. And it reminded me of the NatSemi fiasco - an American semiconductor company which was offering to build a manufacturing plant in Canberra. Our government of the time seemed completely taken by the idea, boasted about it but ultimately fell silent and the proposal just

disappeared like magic. It's disappointing that we were so naive. A missed opportunity? Perhaps, although I don't want to sound gloomy. I've thought about the buoyancy of the time and what we might have done better. And I recall speeches made by Barry Jones in the 80s when he talked about the potential, the opportunities that we should grab. and in particular a keynote address at a conference in Hobart in 1982 by Australian entrepreneur David Hartley. They both spoke of the potential, the opportunities that we should be grasping. Barry Jones was Minister for Science from 1983 to 1990, author of "Technology and the Future of Work - Sleepers, Wake". He was the only politician at that time who realised how critical the timing was. We have always needed more savvy politicians who might have taken the leap when it comes to innovation. That's what's been missing. Anyhow, I don't want to play too much on government - it's not the be-all and end-all, but unfortunately the technology industry has to operate within an environment in which governments rarely see longer than the three-year political cycle. The time lines can be long for innovation and even legislating to create a suitable framework and the conditions needed to support R&D takes too long.

Thank you, as you get a bit wary that you are pushing on the government, maybe we can talk a little bit about the role of media and reporting on the IT industry. So your mentor insisted that it would be a good area to go into, what do you think was the role in the early days of media and journalists in driving the understanding of IT in Australia and perhaps also in government?

Well, it depended on which publication you were working for. While some were substantially focused on reviews of product releases, others were also tracking the technology companies, in particular the major players, whose head offices were located overseas. This meant quite a lot of travel for reporters. I had a good budget on "The Australian" since there were many broadsheet pages to fill, made possible by huge advertising dollars invested by the industry. And this supported our special weekly section. We grew to become larger than the front of the paper and, surprisingly, the largest of any similar section on any daily newspaper in the world. I had stringers filing copy from major centres around the globe and also bought in relevant copy from a number of overseas publications including "The Economist", New York's "Sciences" and "Technology Today". And we were no longer simply tracking the activities of companies selling big systems to big institutions. There was a lot happening right across the market. IBM had unbundled its software and personal computing was on the rise. There was an explosion in software systems. When computer games were first launched, I imported them and had staff take them home at night, play them and write reviews. The various journals were also making similar editorial decisions as the technology rapidly evolved. I also developed a technology market report with the cooperation of the Stock Exchange. This proved difficult since our separate systems at the time wouldn't allow the transfer of data in an orderly way, leaving my reporters staying late on Friday nights to key in the figures after the market had closed. The report then appeared in the high-tech section of "The Australian" on Tuesday. I don't think anyone else had at that time thought to separate out the tech stock in this way.

No, no.

What you mentioned before, you were…

I was referring to the role of tele-communications? And yes. We had to expand to provide coverage of that sector since it's role was pivotal.

Spectrum was being allocated for mobile service and satellites were being launched. I was begging for a separate space to be allocated in the paper to allow us to report more adequately

on the satellite industry and telecoms. The Australian government had established a domestic satellite company, Aussat. This was an exciting initiative although we did not have the technology to build our own payloads or to launch them from Australia. Payloads were being assembled for us by Hughes in the US. At one point a cost-effective deal with China to launch our satellite on a Chinese Long March rocket from their base in central China, was vetoed and delayed by US Congress. They claimed there was a security risk in having a Hughes-built payload married to a Chinese rocket. Although Congress finally gave the go-ahead to the launch it was further evidence that no matter what our aspirations Australia remained behind the eight ball, dependent on foreign companies for much of the fundamentals of a digital economy.

Yeah, yeah I'd forgotten about that, yeah.

Yes, but then we did what we so often end up doing. We sold out to an overseas company. We sold our own financially stressed domestic satellite company AUSSAT to Cable and Wireless and BellSouth, didn't we? And they ultimately sold it on to Singapore Telecom which now owns Optus Telecommunications.

Yeah, that was the beginnings of Optus and…

BellSouth and Cable and Wireless, yes, two overseas companies, so another sad event, and we could talk for years about this.

Oh you could, many, many such examples.

Very sad, but still there you are. And of course there was OTC, our Overseas Telecommunications Company. This was critical to our participation in the international market and the maintenance of our communications links. Our relationship with the International Telecommunications Union was also important. The ITU was responsible, among other things for the allocation of orbit slots for satellites. Having sold our domestic satellite business we became dependent on other foreign service suppliers, including Thai Com for example. And of course the US LandSat.

And you said that…

I was thinking about innovation and was reminded of Eddie Van Halen, the guitar player. You noticed that he died recently…?

Yeah, yeah he had a very unique tapping style.

Did you know that, Eddie Van Halen, famous guitarist, Dutch/American, invented a new guitar, a hybrid guitar, because the existing guitars wouldn't do what he wanted and it made me think that's where innovation comes from. When you can't do something you really want to do, you might have to actually create a way to do it. Eddie's guitar wouldn't play the way he wanted. So he worked on a hybrid guitar and made it do what he wanted. And as they say you only get innovation when you're not comfortable with what you've got. The innovation never comes out of people who are too comfortable, it comes out of people who are wanting to go further. We're watching agriculture do that here in Australia now. Listening to "Sydney Ideas" yesterday or the day before. I can't remember the name of the man discussing perennial soils.

Oh, I know who you mean but I can't remember his name either.

Charlie Massey, the Australian scientist farmer doing regenerative farming. He's building up a great following now, and I thought well there's another bit of innovation. I was involved with a competition in farm software with the Royal Agricultural Society in Sydney years ago and was much impressed by the scope of the submissions. I can't remember the names of particular entries, except one that sticks in my mind, "Piggy Tucker". But this experience serves to remind me of the long history of innovation, going back to our roots in agriculture in Australia and our many unique farming innovations. What do they say: "Necessity is the mother of invention".

There are so many aspects to innovation. Take the music industry, where we have a classic example of Australian innovation: the Computer Music Instrument (CMI). This was designed in Sydney by Peter Vogel and Kim Ryrie, the founders of Fairlight Instrument. The CMI introduced sampling to musicians worldwide and was used by many of the top artists during the 1980s. The Fairlight inventors went on to upgrade the CMI 1 with a string of advanced features until the CMI series 111, which was considered state of the art. Then the arrival of cheaper components and home computers killed off the market for high-end digital samplers like the CMI., and Fairlight went into receivership in the late 1980s.

Yeah, and look, with the interview it's not about talking directly about innovation but more understanding what's in the Australian context that had a lasting, that had lasting consequences that I'm interested in.

Well the company I mentioned before, Cohda Wireless would be a good example of the challenge faced by Australian innovators, the potential pitfalls and persistence required to navigate a route through our particular regulatory landscape. Cohda Wireless was originally a spin-off from the University of South Australia. It had technology designed to link wi-fi networks. Its timing was pretty good. There was an emerging market for vehicle to vehicle, vehicle to infrastructure and vehicle to pedestrian systems. Known broadly as V2X, this allows vehicles to "talk" to each other. It's what "smart cities" are looking for, making them function more efficiently, reducing congestion and allowing road users to avoid accidents. The technology works where GPS can't. It's a really nice piece of Australian innovation. Of course if you asked them they'd admit it has not been an easy path. At some stage they found they were too small to be eligible for particular funding and at others too large, and were left to find ways to survive during the developmental gaps. The first breakthrough seems to have been through participation in a major German Government trial and then trials in Australia. But by 2019 Cohda had established an international reputation and had offices in the US, Germany and China. I'm not familiar with more recent events but if you want an example of how government's involvement needs to be tailored to the specific needs of innovators like Cohda, then I think this is useful. What do you think Graham?

I'd agree, I don't know them that well, I was writing about them a bit when I was doing Commswire a couple of years ago but I certainly know all of them and they were doing some remarkable things when I was looking at them. I haven't followed them for a couple of years though.

I have two directions to go from here and maybe the first one is: where do you think Australia is placed with agriculture in relation to IT?

*A*griculture, very big use, very big advances, you'd be absolutely staggered at the degree to which the agricultural sector has tackled innovation. We're not necessarily talking about

science or technology graduates here but in many instances of farming families, some from generations of the same family that are now making technology work for them. They know if they don't, they may not survive. This is "smart farming", using it for practical tasks like moving food autonomously to herds during drought, for using satellite data, LIDAR, drones, photogrammetry, remote sensing etc to assess soil conditions, crops, vegetation, herds, weather, for checking fencing and other elements of agricultural infrastructure, water supply, the performance of pumps. They're using it for practical tasks like moving food autonomously to herds during drought and the acquisition of advanced agricultural machinery and vehicles to allow for the automatic sowing and harvesting of crops. In addition there is the more sophisticated software used by individual farmers in workflow, accounting, to address issues like disease control, weather and supply chains. Of course much of this is not new. We all remember when tags on livestock and other agricultural produce allowed the tracking of product from paddock to plate, as they say.

What do you think Australia could do in this area to drive more innovation, because that's where a big change is happening now, everybody talks about smart cities but smart farming is the next big wave, any advice you would give on what Australia could do now in terms of supporting the use of high tech or ICT in the context of farming in terms of funding, in terms of support?

Well you need to talk to the farmers about that because the attitude that seems to prevail is that they can't depend on government. They can't wait that long. Government has failed to grasp how time-sensitive, random and unpredictable the issues are that agriculture faces. There are multiple factors at play, not least being the climate, individual weather events and international market forces that require a speedy response and/or preventative methods and mitigation. Are we talking about research funding? Then it's that same problem of long-haul funding. Market forces, the seasonal nature of agriculture, climate change and the vulnerability to and unpredictability of events like disease, mouse plagues, drought and flooding, makes financial management extremely challenging. If we are talking about the upgrade to more competitive and innovative equipment or services, then who can afford it? The cost puts it beyond the scope of many, in particular those on smaller holdings who lack financial wriggle room or timely access to financial support. And so we see the trend towards amalgamation into larger holdings and ownership by very big players in some sectors of agriculture. The impact of this will be felt in terms of innovation, financing and a resulting cultural change to the industry.

Would government intervene in this? Government is already facing the need for faster response to change across most industries so again we see the conflict between the role of government and the power of market forces in industrial transformation or disruption. The bankers too have been challenged when it comes to Australia's agricultural community. They are unlikely to loosen their purse strings further for agriculture or make exceptions.

In spite of the many challenges agriculturalists continue to find ways to innovate, providing new systems and know-how into both the domestic and international market. The marriage of STEM and agriculture is well underway. Graeme, have you seen evidence of some of this?

I've done a lot on that, I was editor of a book called Boundless Plains to Share about agriculture technology in Australia, you're probably not aware of that Sebastian, but there's a real lot of stuff going on.

I was also thinking of the regenerative farming movement, and the technology already in use. I don't know whether government's interested, I don't know whether McCormack knows anything about that sort of stuff.

He doesn't know anything about anything.

You need somebody really smart. You don't need Barnaby Joyce. You need somebody with a brain and some good strategies, given that there's real potential and a great need. Last year's Pearcey Entrepreneurial Awards revealed a big line up of agricultural innovation. It reminded me of many years ago when the Royal Agricultural Society in Sydney held annual competitions for agricultural software. I can't recall the names of the most outstanding entries but some came from farmers themselves. One I recall was called "Piggy Tucker! These were mostly simple but practical systems to solve everyday problems and while they were relatively unsophisticated by today's standards they were certainly innovative.

Thank you Helen, it confirms to me a little bit where my thinking is going, a kind of, one of the big comments came out of that Australia was so strong in in mining IT, is that this was an industry that was readily recognized overseas as Australia being leading, and I think Australia's also recognized as being strong in farming, in agriculture.

So I wonder if that's an industry area where Australia has some leverage, when there is, if there's self-driving cars technology coming out of Australia maybe that's innovative but it's not readily recognized overseas that Australia is a big nation in self-driving, whereas Australia's readily recognized as being big in agriculture.

It's really interesting you say that because I suppose we always come back to our history as a young industrial nation. And that brings us to mining as well. I think Queensland company Mincom is another interesting example, having broken new ground in mine management systems, taken the technology successfully into the international market and extended the technology to support the railway sector, including major players such as Union Pacific in the US. And importantly, Mincom at the same time demonstrated how employee-shared ownership can work in the operation of a technology company.

Yeah, we interviewed David Merson…

Well, in particular agriculture comes to my mind because I think that's where you have so many sensors nowadays for getting so much better, they're what they call precision farming where you don't mindlessly throw fertilizer on your paddocks but you very precisely target where you want to use which kind of fertilizers, for example, but you also mentioned drones, satellites, and so on, so anyways.

Yes, I mean it goes back to what I was saying about Charlie Massey and regenerative farming and also the strong focus now on perennial soils.

Very helpful also, if you find any more about AITEC please send it to me.

Oh yes.

And otherwise I just want to thank you for the interview today and for your time.
Yeah thanks.

End