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The Hon. Gary Nairn
Chair
Inquiry into Business Commitment to R&D in Australia

Dear Mr Nairn

I seek to offer a submission to your Inquiry.

Background: I have been involved in innovation throughout my entire 40 year working life: Whether in research or technical departments, production or marketing groups, my immediate task was always to develop, use or promote new technology. During almost half my working life, this involvement in innovation occurred in countries other than Australia [I have visited 17 countries on innovation errands and I lived a total of 17 years in Canada, Sweden and Japan].

I am a member of the Australian Industrial Research Group and I was present when you addressed the Group in Canberra on August 27.

For the past three years, my wife and I have operated **AOK Innovations Pty. Ltd.**. This is a consulting company focussing essentially on two management areas: **International business arrangements** and **Technology transfer**. The latter is one of the two forms that innovation can take:- If you have an idea, you can *either* commercialise it yourself, *or* you can persuade someone else to take up the idea and exploit it, *i.e.*, you can "transfer the technology".

Definitions	
Development:	Bringing an idea to a mature, workable state.
Innovation:	Changing established practice by introducing something new
Invention:	Outcome of a creative thought process.
Research:	Diligent inquiry or examination in seeking facts or principles.
Technology:	Practical application of science.

I believe that my experience is rare for Australia, hence there could be value in my putting this submission to your Committee.

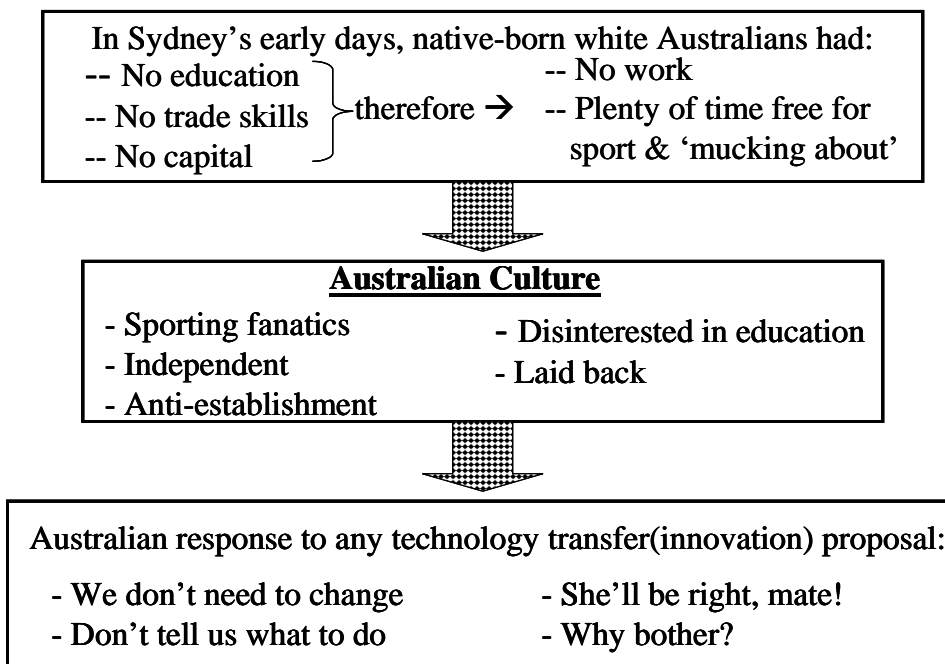
Submission: If I compare Australia with the many overseas countries in which I have practiced innovation activities, I can say that:

Australians are exceptionally-	
GOOD at	POOR at
- Sport	- Communicating
- Relaxing	- Selling themselves
- Inventing things	- Innovation

I am led to observe that Australia is a country where technology transfer is not as easy as it is in other countries. I have tried to understand why this is so and the Appendix (“*Australia and Innovation*”) is the result. I believe that the above table of ‘good and poor’ things is explained by what I found in researching the “why”.

Significantly – in my view – the explanation goes back to the early days of Sydney, let’s say 1780 to 1850. In short, the Australian culture is the problem and no amount of window-dressing or diversionary argument, such as the R&D Tax Rebate debate, ‘old’ economy *versus* ‘new’ economy, academia *versus* industry, *etc.*, will lead to a sufficient improvement in Australia’s poor innovation record.

Summary of the Appendix



A fundamental change in thinking is required. This will take time, so the sooner we start the better and it won’t be simple, as I am arguing that some of our long held Australian cultural beliefs will have to change. Those characteristics of 200 years ago that need to be cast off are:

- Our disbelief that education is valuable
- Our dislike of “clever dicks” and “tall poppies” who claim to know better what we should do
- Our dislike of hard work. *i.e.*, our deep-seated adherence to the view that a ‘day off’ is preferable to a ‘day at’ work

This is a good time for me to prompt the Committee to consider: ***“Do we want to become “less” Australian in order to maintain/improve our standard of living?”***

For, we do not have to make these changes – we merely have to accept a continuing deterioration in our standard of living. That’s the easy way out, but it would be very much in our character to take this path and continue “as usual”.

My research showed that our ineffectiveness at innovation is not new; it has been with us as long as we have been here. Only the jolt of imminent invasion and isolation during the Second World War woke us from our lethargy but not for long: By the 1950's, things were back to normal (the threat had gone).

Let's return to the question: ***“Do we want to become “less” Australian in order to maintain/improve our standard of living?”***

I contend that we need a National *coming together* of politicians to recognise the consequence of us neglecting to address the situation. The fork in the road is still there but other countries have moved down one fork, let's call it the High Road – the road that says humans succeed by using their brains – while we stand and gaze at the Low Road – the road that offers the vista of a continued existence lying under banana trees waiting for the bananas to drop (was this the meaning behind Keating's *'banana republic'* remark?)

Australia is called a *“developed”* country, with needs and values similar to the other industrialised countries, whereas its standard of living is actually based on exports of mainly unprocessed food and raw materials. Out of every 18 Australians registered for work, one is employed in either mining or agriculture. In the past two years, that person ensured that Australia achieved an average net foreign exchange surplus of \$47 billion *p.a.* from his/her efforts. The rest of us, the other 17 plus *another* 18 or so who were not registered for gainful employment, managed to demolish this pile of good, hard currency: Australia as a *whole* averaged a trade deficit of \$6 billion *p.a.* for those two years.

Australia is an under-developed country in current world trade terms.

It is high time that we confirmed our intention:-

- *either*

to accept a third-world existence, for that is where we are heading,

- *or*, in the words of Bryce Courtenay [1986],

to *“strive to be tall poppies. It's time to question everything, to start using our brains, to stop believing that to be an Australian means we're special without trying. Mediocrity as a majority will get us and this nation nowhere.”*

I challenge your Committee to be the nucleus of **real thinking** in Australia.

Allan G. Jamieson

Australia and Innovation

[Charles Darwin noted: *“It isn’t the strongest species that survive, nor the most intelligent, but the ones most responsive to change.”*]

[Barry Jones wrote in “The Australian” (Feb.1992): *“The reasons for our resistance to innovation emerge from our economic history. Australia was regarded as a resource-based economy: We dug up or grew raw materials and shipped them off to people who were cleverer than we were, who processed them and sold them back to us at higher value. ... (over time) Australia became an increasingly service-based, urban society which proved to be a net drain on resources. We bought more services overseas than we sold, and our cities made relatively minor contributions to our exports. Also, agriculture and minerals fell from 55 % of world trade in 1950 to barely 20% in 1991. We were heavily committed to a falling trend.”*]

For innovation to succeed in one country more than elsewhere, the society and culture in that country must respond to change and be tolerant of change. How does Australia rate? In 1986, the Australian Science and Technology Council found that *“Australia’s dependence on overseas technology is, of necessity, high and very little can or should be done about this situation”*. Nothing has really changed since then.

1. Australian culture

Our culture arose from Sydney’s early days. When native-born white Australians began to grow in number, they found themselves at a severe disadvantage: They lacked education, trade skills and capital. The disadvantage continued even after the native-born, as a group, vastly outnumbered those from Britain. In virtually all things that counted among the mighty, the native-born found that they mattered little.

[In *“The Native-Born”* John Molony wrote: For access to land, equality of opportunity was not extended to the native-born and they grew to adulthood seeking a “fair go” and rejecting standards they saw as artificial and spurious. The ‘tall poppy’ disturbed their demand for equality. Education was unattainable, hence irrelevant. It was only in sport, especially cricket, that the native-born could rise above their low position in society. As “Currency Lads”, they repeatedly thrashed the “Sterling” cricket team.]

Many of our supposed characteristics stem from those early days.

mateship	sporting fanatics	“have a go”
“I’m as good as the next”	sardonic humour	fiercely independent
down to earth	practical	

Conclusion No. 1: We do not value education nor do we appreciate “clever dicks” challenging us to think, ergo we dismiss the innovator who seeks to persuade us to change our ways.

2. Importing technology

The factors that bear on the outcome of technology transfer (*i.e.*, Innovation) are numerous; cultural, institutional, educational, political and resource factors all impinge.

[In *“Colonial Technology”*, Jan Todd wrote of two 19th Century imports: (a) Anthrax control: Pastoralists (in 1883) denied that anthrax was killing their sheep. Later they agitated to have the Pasteur vaccine produced in Australia *if* the government paid for it. The NSW government stalled to avoid expenditure, ‘saving’ £75,000 while the colony *lost* £3,000,000 due to the delay. (b) Cyanide Extraction: Cyanide extraction of gold was patented in 1887 in Scotland. The Victorian government approved cyanide use in that colony without payment of a licence but, when the patent was declared valid in Victoria, the Government had to pay £20,000 to buy its way out of its

predicament. The technology was too radical (*chemical* instead of *physical* separation): Australia had insufficient trained technicians and scientists to cope with the needs of gold mines.]

These imported technologies were far advanced. Science in Australia did not have a ready set of answers (nor opinions) and our scientists stood aloof: Until they pronounced upon the situation, everyone else who did was wrong!

Conclusion No. 2: We don't like "clever dicks".

3. "Home grown" innovation

Inventions have never been the problem in Australia: Getting them to be commercial successes, the *innovation* step, has always been the problem! If the inventor lacked the wherewithal to innovate the idea, calling for support was usually fruitless.

[H. Stretton (in *"Australia: The Daedalus Symposium"*) noted that, among the hundred richest Australians in the 1980's, *"luck, inheritance and predatory activities figure largely very few have invented anything or done much technical research and development; scarcely any have made any significant use of Australian science."*]

[Ron Cull examined 35 Australian inventions in *"Innovative Australians"*. He noted that: (i) the colonial government in South Australia offered prizes for the best mechanical strippers and harvesters, but John Bull had to wait 40 years to receive his prize for the first stripper and James Morrow (inventor of the first combine harvester) was never rewarded (ii) when, more recently, the CSIRO made a significant breakthrough in genetic engineering ("gene shears") the patent was sold to a French company because of lack of Australian interest (iii) Overseas interest in Memtec's sewage filtration system dwarfed that in Australia.]

Many Australian inventions relate to agriculture: In 2001, a categorised list of 350 Commonwealth Government funding schemes showed only one fund under Innovation: *"Farm Innovation: Agriculture – Advancing Australia"*. Yet, Australia continues to export its wool mainly in an unprocessed form.

It took the Second World War, when necessity drove the effort, to show that industrial innovation was possible in Australia. Our record was impressive in a great many technical areas, despite starting from a very low educational base; per head of population, attendance at Australian universities before the war was only one-seventh of what it was in countries such as England, USA and New Zealand.

[D. Mellor (*"Australia in The War of 1939-1945: The Role of Science & Industry"*) noted: (i) No artillery gun had been made in Australia before 1936 but, in 1941, all 5,000 components (excepting ball bearings) in the British 25-pounder gun were being produced here (ii) A device was designed and built in Australia to measure the muzzle speed of the Navy's 8-inch guns; the first time muzzle velocities had been measured on a ship at sea anywhere (iii) By 1941, Australia's first large batch of optical grade glass had been made. Australia was able to export glass to USA! *"This wartime success was unsurpassed by any other technical science"* (but the Government withdrew all support as soon as the war ended) (iv) The Beaufort bomber had 39,000 different parts and 600 sub-contracting firms scattered all over Australia were involved in making them, yet the first fully Australian made Beaufort flew in 1941 (v) Despite earnest attempts by Germans at secrecy, BHP succeeded in producing cemented tungsten carbide in under 12 months and Australia was self-sufficient in this key metal-cutting material before the end of 1941 (vi) Australian weather forecasters in the tropics realised that weather theory ("frontal analysis") was ineffective. Their new approach was recognised in 1946 by the Air Ministry in London as *"one of the two most outstanding contributions to tropical meteorology up to this time."*]

Australians had their backs to the wall. Despite their limited education and the limited infrastructure in the land, the output of technologically advanced goods was very impressive. This high technological level, however, did not long survive the war.

Conclusion No. 3: Only with a massive threat to Australia will the Nation pull together on Innovation. In peacetime, we are too comfortable!

4 Government

Australian colonial governments were more hindrance than help on matters technological and things didn't change after Federation.

[R. Renew, in *"Making It – Innovation & Success in Australia's Industries"*, noted that two options were being debated in colonial times: (a) encourage a strong manufacturing base OR (b) increase the quantities of raw materials exported, by lowering transport costs, etc.. The much smaller population that the second vision implied would be too small to support a robust manufacturing industry; most manufactured goods would have to be imported. Fewer people with technical, marketing and innovative skills would be needed and education would play a less critical role. For 30 years after Federation, our Government chose "*men, money and markets*": Britain would supply migrants (*men*) and investment (*money*) to support the agriculture and mining companies in Australia and these companies would export commodities to be processed by British manufacturing industries (*markets*).]

By the 1980's, when the Federal Government *finally* began decreasing tariffs (and disrupted our 'comfort zone'), most domestic manufacturers were unable to compete.

To its credit, the Australian Senate has observed: "*Australians need to be convinced that industry performance and success is fundamental to their standard of living. Without this long-term attitudinal change, Australians have a bleak economic future.*"

Conclusion No. 4: It took 200 years for our Government to realise their attitudinal error.

5. Our Treasury

Joseph Schumpeter, the famous economist of the early 1900's, postulated that *change* is the "norm" of a healthy economy. Change is what creates economic value. In turn, innovation drives change. Yet, it seems that Canberra's Treasury adheres to "classical economics" theory and invariably argues against research receiving favourable tax treatment.

The classical economist is unable to handle the entrepreneur, the climate, politics or technology: These things may exist, but their outcomes are not part of the world of classical economics. An alternative economic theory – now favoured in Europe – states that "*Innovation drives growth*".

[E. Arnold wrote in "Competition and Technological Change in the Television Industry": "*the implications of placing technical innovation at the centre of the stage are very great indeed because it brings down the whole elaborate house of cards upon which orthodox economic theory depends*".]

Conclusion No. 5: Australia must change the Treasury philosophy.

6 Business

Australia is losing out in the race to be internationally competitive. Business expenditure on research and development (BERD) in Australia was as low as 0.21%

of sales in the mid-1980's [the comparable figures for USA and Japan were 1.35% and 1.5% respectively]. The expenditure began to rise in Australia as a result of the Federal Government's R&D Tax Rebate scheme, but it is now below 0.7%. Most OECD countries are increasing their BERD: We are on our way down the OECD ladder. Japan is now spending over 2%, USA is at 2% and Finland is at 1.9%. Three companies make 20% of all BERD in Australia: Telstra, Rio Tinto and BHP. We continue to export mainly low-tech. commodities while importing high-tech. finished products. Along the way, we also import one million bicycles annually. We once made bicycles! From Taiwan, we import metal wedges for axe handles (paying 25 times what we received when we sold the Taiwanese the zinc).

Our ineffective level of innovation explains why stock market analysts here do not put a value on research: "*R&D is on the periphery*", said one. They say that there isn't a consistent link evident here between R&D expenditure and business success. They do, however, point out that this link does exist in USA.

Australian management focus is on cost cutting and from leadership to control, *i.e.*, from innovation to *status quo*. The business "environment" here is not conducive to innovation. A recent international survey showed that Australian business managers placed almost the least value of all countries on innovation: "*Australian executives are in a 'comfort zone'*", the survey concluded.

A 1984 OECD study of Australia noted that ten years previously (1974), Australia had virtually no policy on technology. The study emphasized the need to promote an understanding of the relationship between technology, science and economic well-being, but there seemed to be less agreement on these issues in Australia in 1984 than in other industrialised countries.

Technological change, particularly in this era of trade liberalisation, has irrevocably altered the basis of competition.

[Robin Batterham, Australia's Chief Scientist, stated: "*The only way in the commodity business (to improve your relative position) is to use technology better and more extensively to make improvements.*"]

To do this, we need to be clever but, on average, Australian employees spend less than five hours in training each year: Not the sign of a learning economy!

Conclusion no. 6: Our Business leaders still exhibit the attitudes of the native born in Sydney's early days.

Discussion

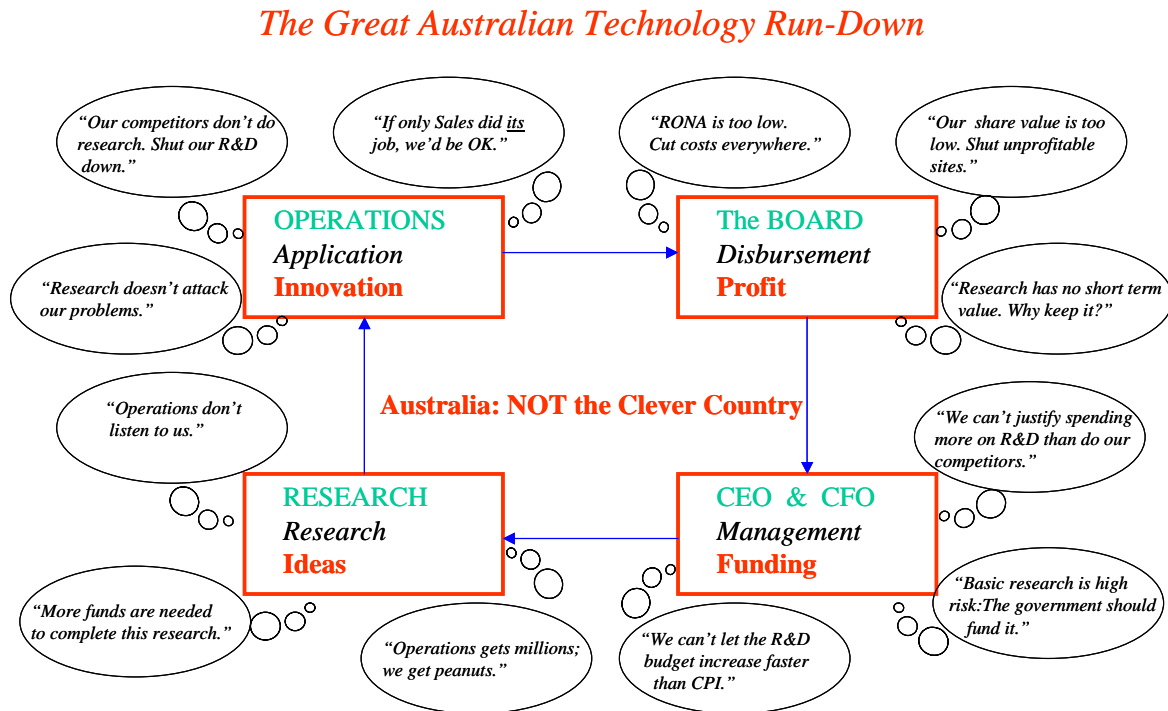
Our lack of support for technology and innovation may be partly explained by the obvious lack of any useful Vision in Australia.

[Prof. Helen Hughes (1985 ABC Boyer Lecture) noted: "*If trends are not changed, then within thirty to forty years – that is well within the lifespan of children now at school – Australia could become one of the least competitive countries of Asia. Bright young Australians would have to seek scholarships in countries such as Singapore to explore the frontiers of knowledge. Unemployed Australians would be looking for labouring jobs in rapidly growing Asian countries.*"]

There have been many inventions in Australia during the past 150 years, although few had smooth and trouble-free paths through the innovation step and most inventors struggled to profit from their ideas. Examples such as the stump jump plough and

Hill's hoist support the maxim "*necessity is the mother of invention*", but she doesn't seem to be of much help in transferring ideas to practicality! In the innovation step, the inventor finds himself/herself alone.

It is tempting to conclude that the one aspect of the Australian culture that has played a restricting role in technology transfer is our anti-education attitude. Further, we did not learn the lesson: We accepted ignorance in the 1880's (120 years ago) and we still do.



Australian business attitudes are a huge deterrent to innovation. The run-down of business research and development expenditure means that companies are not even able to generate and use their own internal technology – nor have they the experts to assess outside technologies. *Thus, if you can avoid having to seek support from an Australian company to innovate your idea, you are more likely to be successful.*

Australia is called a "developed" country, with needs and values similar to the other industrialised countries, whereas its standard of living is actually based on exports of mainly unprocessed food and raw materials: ***Technologically speaking, Australia is an under-developed country in current world trade terms.***

If Australians continue to be very ineffective in applying the results of research, *i.e.*, we remain poor **Innovators**, then we can look forward to an ever-diminishing capability of competing in the world.

A Successful Vision for Australia is lacking.

The Vision must facilitate support for these new strategies:

- achieve higher levels of general, technical and continuing education;
- recognise and support achievements of scientists, engineers and technicians;
- be aware of the *essential* value of innovation;
- become sophisticated and critical consumers.

About the author:

Allan Jamieson was born in Bendigo in 1940 and graduated with honours in Chemical Engineering from Melbourne University in 1962. He later spent 17 years overseas, working in research, manufacturing and marketing roles in Canada, USA, Brazil, England, Portugal, France, Germany, Belgium, Holland, Italy, Sweden, Norway, Finland, Japan, Vietnam, South Africa and New Zealand. He played a leading role in the group that was awarded the Swedish Government's Environment Prize in 1972. He has been granted 3 patents. He returned to Australia in 1981. With his extensive experience in innovation, he founded **AOK Innovations** Pty. Ltd. in 1999.