

Innovate for industrial growth

by John Blakemore

Australia has very special and pressing problems. We have failed to capitalise on opportunities in the nuclear and aluminium industries, and we are still hostage to commodity prices which have collapsed in the last year. Our basic manufacturing industries have been decimated and multinationals like Ford, GM and Toyota are preparing to close their facilities in Australia.

We still govern on a three year window where successive governments concentrate on devising strategies for re-election rather than the long term interest of the nation. Each state, regardless of size, has the same number of senators and many are poorly educated and have no idea of how to work together for the common good.

Australia currently carries more than \$660 billion in debt and we have the fastest growth in spending among IMF nations. So how are we going to clear this debt log jam? How do we generate the wealth to support our economic commitments?

Australia urgently needs to find new sources of industrial growth. More precisely, we need to invent them. Australia must boost its capacity for strategic innovation in areas where we have the skills and knowledge or can develop them. We must become more innovative, and in my view, it is up to disciplines such as engineering to find the way forward.

Personally, I have had to innovate in my own career when my plan to pursue a career in nuclear engineering, complete with a PhD on the effect of radiation alloys, was interrupted by the decision not to build a nuclear reactor in Jervis Bay in 1970. Since then my experience has ranged from spraying liquid steel at 1600 °C with liquid oxygen at -196 °C to working on the next season's range of female swimwear.

The ability to innovate and change has been good for me professionally but it has also helped make a difference to my own and others' lives. My mother went blind at the age of 55. She suffered from angle closure glaucoma with superimposed chronically high ocular pressure. It appeared that the same fate awaited me when I was diagnosed with the same condition in 1991.

I was angry and upset. I refused to leave the surgeon's consulting room until he illustrated and explained the condition in a way I could understand. He reluctantly

drew a picture of the eye and explained that the ocular pressure was squeezing the optic nerve which was feeding the retina with blood.

To me as an engineer this seems like a very easy problem to solve.

"Why don't we cut a canal in the corner of the eye and allow the fluid to drain to relieve the pressure?" I asked.

"Everyone has tried that and it does not work," he said.

"Okay, why don't we drill a hole in the iris so that at low pressure the fluid will escape by capillary action and at high pressure the fluid will squirt out and so relieve the pressure on the optic nerve?"

"You can't do that," he cried.

"Why?"

"Because no one else in the world has done that."

To me, this was like waving a red rag at a bull. So several conversations and some months later it was agreed that we would drill the holes one at a time.

The first operation on the left eye went reasonably well. Some 40 shots of the laser finally produced what was thought to be a satisfactory hole. The surgery worked and that operation is now a standard in Sydney – and elsewhere – called the iridectomy. The lesson for me was that by bringing my engineering discipline to a problem in another field, I have saved not only my eyesight, but that of others.

What other problems – that medical and other professionals believe to be insurmountable – might we engineers resolve?

I believe that it is engineers and others like us who are equipped to lead Australia in adapting to the new paradigm through innovation and creativity. Engineers think differently. We have the mindset – as well as the skills – that can help craft real and workable solutions to many of the challenges we face, on the micro and macro scale.

Eratosthenes, born in 276 BCE, measured the circumference of the earth at 40,000 km – using a stick. The actual circumference is 40,075 km. Albert Einstein postulated that there must be a "cosmological term", to explain the stability of the universe. That is the sort of thinking that is required for our future and we are fortunate in 2015 to have more sophisticated tools to aid our work.



AUSTRALIA URGENTLY NEEDS TO FIND NEW SOURCES OF INDUSTRIAL GROWTH. MORE PRECISELY, WE NEED TO INVENT THEM.



The next major wave of change in all economies is the speed of innovation.

Digital data now enables us to innovate faster than ever. The internet brings together a degree of teamwork and collaboration never seen before and this will be intrinsic to future success.

Accelerated technological developments, compounds constructed molecule by molecule, solids built atom by atom, cloning, genetic engineering, photovoltaic paints, climate change – an endless stream of new ideas is needed to embrace and create new opportunities.

Even the best of us are unable to grasp the full significance of all the events of the world around us. We need to use data more effectively to enhance standards of living, improve health and assist in solving all types of people problems as well as technical ones. We need enthusiastic, intelligent creative well educated people capable of thinking outside the square, asking why and why not.

Our value-added industries have not kept pace and we do not compete on a level playing field. We cannot afford to continue to ride on the back of high commodity prices and mining.

Over the last 30 years, my company has studied and worked for what we consider to be some of the world's best companies. These include Honda, Panasonic, Mercedes Benz, Braun, Pirelli, Cochlear, Canon, BHP, CSIRO, Toyota, Bluescope, Speedo, Seeley, ANCA and many more.

We have also tracked the rise and fall of many giants of the past – such as GEC, Email, Ford and Chrysler. The key issue signalling demise is the lack of innovation and the inability to move quickly as the market and technological developments take hold. Working with a wide range of industries, I am continuously surprised at how slowly opportunities are seized by most companies. I still wonder at the opportunities lost.

Many years ago, I measured the efficiency of a coal mine in the Hunter Valley. My measurement was 32%. The management were initially scathing in their criticism of my report since a world-renowned global consulting firm claimed that it was 98%. When given the opportunity to work on some bottleneck areas, we were able to improve productivity of the whole mine by 16% in less than six months. However, the coal loader at Newcastle could not cope with an increased volume of coal and the improvement program ceased.

While this raises simple issues on the definition of efficiency and productivity, the point remains that while we define 98% efficiency as being the capability to service the existing structure, we fail to realise the potential that a 16% productivity gain could deliver.

Businesses in the future will move at higher velocity, with greater creativity and capacity for innovation. We must step up to this opportunity, by challenging the status quo and bringing creativity, innovation and our professional skills to the task of re-engineering our sense of what is possible. We can start with our existing context – but we must also work in collaboration with other professions, combining our skill sets with doctors, scientists and others who are charged with delivering solutions to Australia's most pressing problems.

By doing so, we can establish the foundations for new sources of competitive advantage – for their businesses, our businesses, for industry as a whole. And who knows? At the very least, you could improve your own life and the lives of those that are near and dear to you. ●

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