

In Conversation with Donald Hector

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Abstract

RSNSW President Donald Hector interviewed by Nobel Laureate Peter Doherty for The Conversation on his views on science and technology in Australia, and the role for the Royal Society of New South Wales in promoting informed discussion on issues relevant to the well-being of society.

Peter Doherty: Thinking in terms of Australia's future, how important is it for us to expand activity in the innovation / high technology sector?

Donald Hector: It's critically important. If you look at countries that have been successful since the early days of the Industrial Revolution they've largely done so through having highly innovative industries that maximise utilisation of technology.

Peter Doherty: Do you think that an expanded high technology sector should focus solely on areas like IT, encryption, software development and so forth, or should we also be expanding niche manufacturing and both heavy and light engineering applications?

Donald Hector: It's all of the above. ICT is very important because there are enormous

business opportunities in the industry; it's still very much in its infancy.

But it's also important to be developing niche operations and manufacturing capability in areas where Australia has a natural strength. Biotechnology and pharmaceuticals are a good example of that. Also industries that provide capability for areas where we are globally competitive such as mining and agriculture. And doing these on a world scale is also an opportunity that Australia has persistently overlooked.

There was a report commissioned by the government in the 1950s to take a snapshot of Australian industry immediately following the Second World War; pharmaceuticals are a really interesting case study.

We didn't really do much in the way of pharmaceuticals manufacturing at all until about 1948. We then started to manufacture

penicillin. Australia was only the second country in the world manufacturing penicillin commercially and was the first country to make it available for the general population.

We started making penicillin in 1948 and by the mid-50s we were one of the biggest penicillin producers in the world, if not the biggest. In 1950 the value of locally-produced pharmaceutical actives was £6.7 million and imports were £630,000. Over 90% of pharmaceutical actives used in Australia were manufactured in Australia.

Today the reverse is so. Over 90% of active pharmaceutical ingredients are imported, and the local content is largely limited to formulation and repackaging. We've gone from being in a very dominant position and self-sufficient position to an absolute devastation of that industry.

But it need not be like that. [Biotherapy company] CSL made the transition from government-owned enterprise to a highly-successful publicly-owned company, and is now one of the biggest producers of blood products in the world.

Tasmanian Alkaloids, which was started in Tasmania by Abbot Laboratories in the 1950s to produce opium alkaloids, was sold to Johnson and Johnson – why did this not end up in Australian hands?

Apart from a bit of generic pharmaceutical manufacturing in Australia we no longer make the medication that we need to treat chronic disease such as hypertension, diabetes and heart disease. If the supply of those were interrupted for some reason we'd be in a lot of strife.

Peter Doherty: What could the universities do better, both in the sense of discovery and translating discovery for economic benefit?

Donald Hector: I'm rather of the view that universities are best suited to doing pure research, and from time to time really good stuff will come out of that. But I think you need research institutions that are not constrained by a heavy requirement to produce income out of their research.

That's best left to private sector, and possibly government, and that's why I think the CSIRO and ANSTO [Australian Nuclear Science and Technology Organisation] are so important. They should be the commercial arms as was originally intended, and develop industrial research so that it puts Australia at the forefront of innovation.

Peter Doherty: What could CSIRO and other government research agencies like DSTO (Defence Science and Technology Organisation), ANSTO do better to promote greater economic activity?

Donald Hector: I'm not sure I'd include DSTO in that because they have very specific purpose.

I think CSIRO and ANSTO, and particularly CSIRO, are much maligned. They've created very innovative inventions over the years, and have been responsible for some truly fantastic technological developments.

But we expect them to deliver success with every project, and research is not like that. We also expect them to do so on shoestring budgets. There's nothing worse than funding a project that might be expected to cost \$50 million and finding out that it needs twice that, and then saying that you don't have the money to continue and killing the program.

The reality of research and development is that if you think you've got a project \$50 million then you've at least got to have a couple of hundred in the pocket to take it through, if you think once you get to \$50 million it's still got potential and that with more money it can deliver success.

I'm not suggesting that we should be trying to pick winners, nor am I suggesting that we should hesitate in killing off research programs that aren't going to deliver. There needs to be a very critical examination using some sort of stage gate process to do that. But you've got to make sure that you focus your funding on areas that are likely to be a success, kill off the programs in the early stages when they look like they're not going to succeed, and heavily fund the ones that show potential until they are successful, recognising that that usually takes a lot more money than you originally expected.

Peter Doherty: What are the barriers from the business side?

Donald Hector: We're not particularly good at managing risk in Australia. We're not particularly good at taking risks, nor are we good at managing them. What Australian companies, particularly the top 300 of the ASX, have historically done is to have very strong government lobby groups and the Australian governments, irrespective of their political persuasion, have been very heavily persuaded by them.

Historically, the argument was that Australia's not a big enough economy to have a fully competitive market place and so oligopolies and duopolies have been the flavour of the day. But that's no longer the case. We have a population of 25 million, we can have a fully open and competitive economy and there's more than enough room to have full

competition without looking after these duopolies in the way that's been done in the past.

What I think that's led to is a lack of entrepreneurship. We lack a *mittelstand* in Australia of the type they have in Germany. I think there's three million smallish, family owned companies in Germany that typically that have a few hundred employees and they're world leaders in a niche area. They supply world marketplaces and the big German manufacturing sector. We've never developed that here because we've been too eager to look after the larger companies that feel that the Australian government owes them a living.

Peter Doherty: Are we too risk-averse?

Donald Hector: I don't think we're risk averse – I think we don't understand the nature of risk. In managing risk you've got to be very skilled and have the capacity to understand the extent to which you know the ambiguities of situations and the likelihood or otherwise of success. That's very difficult. It requires a great deal of judgement and a great deal of experience. In Australia we tend to be fairly gung-ho and somewhat undisciplined, but the people I've met when I've worked overseas are generally people who manage risk well are not risk takers. They know when to take steps and when not to take steps and they generally have very good business judgement. I think we often lack that in Australia.

Peter Doherty: Do we persistently under-invest?

Donald Hector: We often under-invest and then don't make sure that we get adequate return on the capital that we do invest. We often think that a project is going to cost a

certain amount of money, and then when we get to the point where we've either run out of money and there's no more available or people get cold feet and don't want to take it through to completion.

Peter Doherty: What can government do better? Are the tax settings right?

Donald Hector: I'm not sure that a general tax policy in terms of support for industry is a good idea. We certainly need research-and-development tax concessions. We need to have some public funding to encourage research and development expenditure, and we've got to recognise that issue and get a tax break on that.

I'm also of the view that if you're going to develop competitive industries you've got to have early-stage government support to do that. Virtually every major industry around the world is a consequence of government research programs, very often in defence sector.

If you look at the US, a lot of the industries there have their origins in defence industry. It's not uncommon to have in engineering faculties in the leading US universities to have hundreds of millions of dollars from government research funding for defence projects.

Australia could decide to be a much bigger player industries where we have some very clear internationally-competitive positions. For example in agriculture and mining, why aren't we more fully integrated into those industries? Why aren't we the manufacturers of agricultural and mining equipment as we were once?

Why was the government response to the car industry crisis not more visionary? We could

have taken the several hundred millions of dollars of car industry subsidies and made that money available to a couple of the big earth-moving companies like Caterpillar or Komatsu to establish their global research and development and world-scale manufacturing facilities here.

To me you need government policy to encourage the development of those industries, but you've got to do so in a way that will be internationally competitive and is going to develop an industry for the long term.

As occurs in countries like Singapore, and in the various US States, should government be actively pursuing financial and tax relief packages to persuade high-tech R&D to locate here?

I've been involved in one instance a billion dollar project that didn't get built in Australia, even though it would have been a good place to build, because there was too much bureaucracy from the federal government and the state governments to agree what sort of tax incentives and regulatory incentives would encourage investment. Eventually that plant went to China.

Peter Doherty: How do we encourage greater philanthropy, "angel investors" and so forth?

Donald Hector: I'm not sure that there's necessarily a place for philanthropy in developing technology, but certainly there is for angel investors.

One of the problems in finding angel investors in Australia historically is that there's just not enough private wealth here. But I think that's changing now because of the very great economic growth that's taken place in

the last decade. My guess is that there's no shortage of angel investors if you've got good managers that they've got the risk of the project under control, and they're good, professional, capable managers. We probably don't have enough experience of that here, so we're probably going to be relying on bringing people in from overseas, particularly the US, to manage start-up companies.

Peter Doherty: How important is it that we get a much better public buy-in to the idea that science and technology are important for our future?

Donald Hector: It's very important because science and technology nowadays are so complex that it's hard for lay people to really understand what the issues are. They get heavily influenced by special interest groups that might have an axe to grind about technologies coming to fruition.

I think we've seen this very much with issues like climate change where scientists have been vilified for speaking their mind and special interest groups are very quick to distort facts and throw misinformation into the debate to muddy the waters and pursue their own interests.

It's very important to have institutions there that can lead the discussion and make some

of these things more readily available to the general public and more able to have the information accessible.

Peter Doherty: What are you aiming to achieve by re-invigorating the Royal Society of NSW, and how do you see such long-established institutions functioning in modern Australia?

Donald Hector: We want the Royal Society of New South Wales to be true to its original charter of encouraging "... *studies and investigations in science, art, literature and philosophy* ...". The main aim behind that is to advance knowledge and encourage innovation and entrepreneurship to develop the resources of New South Wales and, more broadly, of Australia.

We see our role as providing a forum where we can bring together people who are interested in seeing those things happen and being a facilitator so that we can bring important issues to public attention and to influence policy. We want to provide a place for people to meet who are engaged in those areas of human knowledge, for them to exchange ideas and to learn from one another.

