

Fostering “Research and Development” in Australia

How does country with a population of only 20 million people sustain economic growth? In the State of Queensland, their answer has been to become a global hub for knowledge intensive industries. I visited Queensland to discover more about their “Smart State Initiative”, what is supporting it and the outcomes it has delivered.

By Fujio Nakano

The constant construction being undertaken at University of Queensland in Brisbane, Australia is enough to make you joust that the “Chancellor must have background in the industry”. In the boardroom of one of the newly constructed research facilities, the Australian Institute for Biotechnology & Nanotechnology (AIBN), the Manager of UniQuest, Dr Belcher, introduced me to a soft, thin square piece of film, with sides no longer than 1cm. The material was clear like Glad Wrap, had rubber-like elasticity and withstood great impact and was hard to mark. Researchers at AIBN created this material by adding miniscule nano particles to polyurethane. They are still searching for applications for the product that will maximise the unique features of the material, but for the time being, the product is currently being applied as a coating on the surface of golf balls.

“Up until now, we have only been able to test formations in a laboratory setting, but with the support of the State Government, we have acquired new testing devices and are currently processing a number of different patterns. The reason we have applied this technology to golf balls, is because the inventor just ‘happens’ to like golf.”

UniQuest was established in 1983 with the aim of commercialising the University of Queensland’s research activities. And, naturally, the company’s head office is located within the grounds of the University. The main role of UniQuest is to license and commercialise university technologies and expertise and is not dissimilar to the TLO organisations which have been established in Japanese universities in recent years. However, UniQuest, with a staff of close to 100 people, are involved right from the preliminary phases of the research, provide support for development and testing, marketing and establishment of start-ups and even negotiations with overseas organisations and could be described as being similar to consulting companies which specialise in technology, of which there are many in Western society. With the support of

UniQuest, the results of the research being carried out on the nanofilm mentioned above have been introduced to several Japanese manufacturers and technological tie-up discussions are currently in progress with these manufacturers.

There are also some start-ups which originated from within the University that have gone on to become successful stand-alone companies. Global Formaldehyde & Resin Technologies (GFRT) was once a part of the University of Queensland as a start-up and the CEO, Dr Miller, is of course a researcher himself. Correction, *was* a researcher. “I was invited to join this University as a Chemistry Lecturer in ’95. At the same time, I was doing cutting edge research with a ceramics company and also visited Japan to conduct research on super-conductivity. Our company currently sells silver catalysts to Japanese companies.” According to Dr Miller, he has visited Japan 22 times and the Japanese companies that his company is dealing with are all large chemical manufacturers.

The Difference in the Quality and Quantity of Support

In terms of the refining and processing of silver, Japan has a long history in precious metals and money production dating back to the Asuka Period (end of the 6th Century to the beginning of the 8th Century), but this is completely different for catalysts. The silver catalyst that has been developed at the University of Queensland has a large surface area and efficient chemical reaction and furthermore they have extended the catalyst life from the conventional 3 months to 12 months. The catalyst has been manufactured in partnership with a company in Western Australia and is being supplied to chemical manufacturers all over the world. There are many companies with similar stories to GFRT that are continuing to emerge from the University of Queensland.

It is virtually expected that new discoveries and cutting-edge technology will be born in University laboratories and it is certainly not only the University of Queensland that is seeking to commercialise its R&D ventures. This practice is not uncommon in other countries such as Japan and America. However, when looking at it in actuality, there is a clear difference.

For example, in Japan, since National Universities have become Independent Administrative Organisations, there have been many engineering researchers who have established development companies. However, many of these companies rent a cheap,

small office space, have a business card with CEO written on it and in regards to the actual commercialisation of their IP, a lot depends on the researchers connections with the private sector. It is safe to say that there are practically none which have been started from within the University or where the researcher themselves has gone on to become the CEO.

But where does this gap originate from? What is clear is that there is a difference in the quality and quantity of the support that is provided by the University. In the case of TLOs at Japanese universities, their main purpose is technology transfer and they do not place priority on establishing start-up companies. However, at the University of Queensland, technology transfer is a given and extra support is provided for business start-up and marketing. Why is there such a difference?

One reason could be the environment within Japanese universities. One of the contributing factors to the disputes between Universities which occurred in the 60s and 70s was the “shady relationship between the Universities and Corporations”. On one hand you had the Universities who were focused on academia and on the other, were companies who were focused on the bottom line. Despite the fact that TLOs are becoming more commonplace, the reason that Japan’s laboratories don’t make more dynamic moves to commercialise or corporatise their successes could be the fact that there are still remnants of this “culture” remaining within Japanese Universities.

In Australia, there is no such history and the relationship between Universities and the corporate sector has been smooth. However, this is not the only reason that Australian Universities commercialise their technology and create cutting edge technology companies. The same dynamism is happening outside of the Universities as well.

iLab is an incubator located in Toowong, which is situated not far from the University of Queensland’s main campus. Anne-Marie Birkill, Chief Executive Officer of iLab, describes their operations in this way:

“Our organisation works with individual entrepreneurs, developers of new technologies and spin-offs to facilitate the commercialisation of their technologies. We have 32 companies in sectors such as IT, both hardware and software, Biotechnology and Nanotechnology. We have companies which vary in size from 1 person operations to 20, but all of the companies are yet to make a profit.”

iLab divides the commercialisation process into five steps. 1. Emergence of Concepts; 2. Selection; 3. Growth; 4. Maturity; 5. Decline. iLab is responsible for 2 and 3, taking the technologies that have been selected and taking them through to the final stages of growth, which can take anywhere from 2 to 5 years. During this period, iLab provides office space along with access to their 4 laboratory facilities. On top of this, iLab also provides support in areas such as the protection of IP, sourcing venture capital, finding business partners and securing a market for the product.

“The most important aspect of what iLab does is the mentoring and business support.”

According to Ms Birkill, for each company in the incubator there are three professionals appointed to provide guidance and mentoring. There are over 40 professionals, from which each client can choose three to provide support to their operation free of charge. These professionals include lawyers from patent offices and people with experience as senior executives in multinational companies such as IBM and Microsoft, as well as experts in each field of technology and entrepreneurs who have been successful in establishing their own companies. After receiving this support, clients then embark on establishing their business on their own two feet. So in the same way that UniQuest supports technologies being developed at research laboratories within the University of Queensland, iLab is an organisation which supports the commercialisation of technologies being developed by the private sector. In other words, it is safe to say that the support for both the private sector and Universities is fully covered.

Thorough Support from the State Government

In the background of this is the Queensland Government’s support mechanism. It goes without saying that the State-owned University of Queensland is an integral part of this, but UniQuest is also no exception and iLab is also an incubator which is 100% funded by the Queensland Government.

Whilst the Government’s support is weighted towards cutting-edge sectors such as biotechnology, nanotechnology and, it is certainly not limited to these areas. For example, the Government has also supported ventures such as the development of the “Hear and Say” system, which is an educational and medical tool that places the “Cochlear” microscopic electronic device within the inner ear of hearing impaired children to help them with their hearing and speech. The Government has also supported the commercialisation of the world’s first singled-handed scalpel blade remover,

developed by a practising Clinician and the subsequent establishment of the company “Quicksmart”, but the same doctor. Furthermore, the Government also supports the Queensland Clinical Trials Network (QCTN), which is reducing the time for clinical trials of new drugs. Whereas traditionally confirming the safety and effectiveness of new drugs involves lengthy clinical trials, QCTN is improving the efficiency of this process by working with testing bodies, not only in Australia, but all over the world. These sorts of ventures display the detailed support which the Government is providing for these emerging industries.

Located in the north-east of Australia, Queensland has a population of 4 million people. With international tourist hotspots such as the Gold Coast and the Great Barrier Reef, the tourism industry accounts for a large portion of the State’s GDP. However, more than tourism, Queensland has a large livestock industry in beef and wool, agricultural sector in sugarcane and wheat and above all else a resources sector, including oil, coal, natural gas, copper and bauxite, which generates a great deal of income to the State. In a country which has abundant reserves of natural resources, Queensland has the best growth rate in Australia. Furthermore, with rising oil prices and a heightened awareness of environmental protection, the expanded use of bioethanol is also being touted and the good growth in Queensland’s mining and agricultural sectors is expected to continue.

Therefore, even if the current industry structure remains the same, it is more than reasonable to expect further growth and development. So, it begs the question, why does the State Government continue to provide strong support to these new areas, from cutting-edge nanotechnologies right through to small-scale discoveries and inventions by individual researchers and entrepreneurs.

The fact is that these new cutting-edge technologies also have applications within the State’s traditional major industries. One example of this is “Clean Coal Technology”. Coal is a very important industry within the State and is also the main source of electricity for its businesses and residents. However, as is widely recognised, coal fired power stations have a large volume of CO₂ emissions. If these emissions were to be reduced to a level close to zero, then surely the value of this “Clean Coal” from coal deposit rich Australia would increase. In order to obtain this technology, Government Owned Corporation, Stanwell, has established the Zerogen project in Rockhampton, which is located to the north of the State’s capital, Brisbane. The project is designed to

introduce technology which will capture CO₂ from the emitted gases and store it underground. The technology, which involves storing the CO₂ in cap rocks, which are found in old natural gas fields, has also been used in Norway. The State Government is promoting this technology and attempting to become the first in the world to successfully demonstrate this technology.

The Strategy Developed by the State's Premier

In short, Queensland, regardless of whether it is big or small, is involved in supporting the commercialisation and corporatisation of many R&D and new technology projects. The policy which is focused on these science and technology sectors is called the "Smart State Initiative (or Strategy)". Why was this strategy developed in a State where they have abundant economic resources and security of guaranteed future prosperity? It was the State's Premier, Peter Beattie, who himself proposed this strategy.

The Labor Beattie Government first came to power in June 1998. Since then, his Government has won three landslide victories and the State is now in its fourth term under the Beattie Government. Traditionally, Australia's State Premiers have always held a lot of power, but in the case of Queensland, with its strong economic growth, has always held a lot of influence at the National level. However, under the former National Party Government, the State was considered to be quite conservative and the Southern cities often referred to Queensland as the redneck State.

Mr Beattie has a background as a lawyer. The Premiers Office has provided me with comments on why he proposed the Smart State Strategy when he assumed the role of Premier in 1998,

What made you decide to proceed with the "Smart State" policy?

"Queensland has long been recognised as having many natural advantages – it's rich in commodities, has some of the most efficient and effective primary producers in the world, has a rich natural environment with world heritage areas and many other attractions which bring people from all over the world to our state. However, we need to continue to innovate or the state economy will stagnate."

Queensland has an abundance of resources and its economy is growing. Being the most

stable and wealthiest State in Australia, did you find any uncertainty among the people of Queensland when you decided to implement the “Smart State” policy?

“There is always a need for Governments to fully explain the reasons behind major policy decisions. Certainly with the Smart State Strategy, there’s been a need to confirm that the Smart State is not only about providing jobs for white-coated scientists or high tech engineers. It’s through the success of our investments that the message behind the Smart State Strategy is communicated to the community. We can show that since the Smart State Strategy has been developed, economic growth in Queensland has grown faster than the combined growth of the rest of Australia, and the employment growth in Queensland is also considerably higher than in the rest of Australia. However, it’s the concrete examples of successes that mean a lot to people. A great recent example is that of Professor Ian Frazer’s success in developing a cervical cancer vaccine. This is a vaccine against a disease that currently kills around 270 000 women each year.”

What is your vision for the future of the State of Queensland?

“My vision for the future of Queensland is a place of a booming economy, continued low unemployment and an enviable quality of life. It is a vision of a knowledge-based economy to ensure global competitiveness, higher-value jobs, enhanced prosperity and a sustainable economic future.”

Australian author Donald Horne, with a hint of irony, was the first to call Australia “the lucky country”. That was because if one were to peel back the surface, there was an abundance of natural resources and all they needed to do was to export this and the economy would remain strong.

Even now, Australia remains in its “lucky state”. On the contrary, in comparison to Japan, it could also be said that Australia has been lucky in another sense.

Among the developed nations, Australia has a low population of only approximately 20 million people. Consequently, the manufacturing industry in such areas as household appliances, never took off in Australia. It was cheaper to import these products than have them manufactured locally. As a result, it could be said that the new concept that technology is essentially “making something (R&D)” came naturally to Australia’s politicians and Government officials.

In comparison, Japan's economy has continued to rely heavily on its manufacturing industries in areas such as household appliances and automobiles. Japan has focused on manufacturing in volume as opposed living off royalties and licensing fees for their manufacturing technology. Subsequently, that manufacturing has now moved offshore to China.

Presently, Australia's "lucky" comes from the fact that they haven't relied on the manufacturing industry. Furthermore, in Queensland, their "lucky", I believe, more than anything else, is due to that fact that the politicians have focused on innovative areas such as R&D and knowledge intensive industries. So, who are the people who are underpinning this innovation? How have these people been nurtured and fostered? I'll introduce this to you in next month's edition.