Stimulating Innovation:
Business and Government strategies in Australia and China

Investment in innovation: the Government dilemma

Despite obvious differences in their state of economic development and growth, both Australia and China see involvement in science and technology, and in the effective commercialisation of science, as important. For both, systems to influence the priorities in research, to shape and influence development, and to encourage commercial exploitation of ideas are important. It is this element that is the focus of this paper.

In the case of Australia, in recent years the government has been seeking to balance the competing needs of

- playing a key role through coordinating the science and technology effort, and
- creating an environment in which science and technology can flourish.

Several measures in recent years have sought to influence the direction and focus of research and development, but in other regards the focus has been more on letting market forces determine the paths of development, and merely supporting and enabling the area generally It is not always clear as to what constitute market forces, of course. In the world of research, there is both the external market of companies seeking to exploit research, especially applied research, and there is also the internal market of researchers, who themselves make judgements about the value of research initiatives proposed by their peers.

This is particularly well illustrated by the case of the Australian Research Council (ARC), which allocates funds for research to universities. A long-standing element of the ARC approach has been peer review, with proposals for funding going out to

experts in universities to rank them. In more recent years the government has sought to have some full time staff appointed by the ARC to assess projects – an approach that has attracted a good deal of concern, diminishing as it does the role of peer review, but also leaving open the possibility that the ARC might favour some areas of research, or researchers. However, even the traditional peer review model has challenges, not least of which is the allocation of funds between disciplines, which itself is a form of 'direction'. At the same time, considerable ARC funding goes to projects where there are companies also supporting the research – thus allowing a 'market forces' element to be influential.

Overall, there are a number of elements of the Australian central government approach – both through the recently announced set of initiatives concerned with promoting a national innovation strategy, and through those policies concerned to develop the commercialisation of innovative technologies – which are aimed at improving Australia's international competitive capacity by using new ideas, concepts and methods. To this end, priority has been given to the formulation of the governmental initiatives for the scientific and technological development from the point of view of the national development strategy, focusing on the reinforcement of both planning and guidance. Those initiatives include plans and policies for cooperation research centres (CRCs), tax reduction and exemptions for R&D, support for R&D and innovation, a national plan for key research facilities, developing the risk capital market and the identification of the national priority areas of research.

In addition, specific technological plans have been actively implemented to give a push to technological transformation, dissemination and commercialisation. In this connection, an information and communication technology centre, an intellectual property research centre and a biotechnology centre have been set up. The Australian government and the state governments, enterprises, and research institutes, all are committed to and involved in the whole process of technological transformation. In Australia, almost every state has the independent and different plans to support industrial innovation, with a view to creating an environment and providing the service for the small- and medium-sized enterprises to commercialise their technological innovations, and to meet their needs. Research institutes and the universities attach great importance to their cooperation with the enterprises, as well as spinning off their own research achievements out into the market, and collaboration has become well-established practice.

An interesting example of the relationship between policy and implementation is provided by recent exploration of issues to do with innovation. In 2000, the Australian government took part in a national 'Innovation Summit', itself an initiative of the Business Council of Australia, a membership body representing large companies. The Business Council and the Department of Industry, Science and Technology jointly hosted the innovation summit. The summit brought together people from the private sector, government departments and agencies, scientists, research, innovators and entrepreneurs. In establishing the importance of innovation as a key tool in economic development and business competition, the Summit proposed a number of recommendations.

Following the Summit, an Innovation Summit Implementation Group was established, still as an independent initiative, and again with the support of the Business Council

and the Department of Industry, Science and Technology. The Implementation Group made a more detailed set of recommendations, and these were assessed by the Government in 2001, following review by its Prime Minister's Science Engineering and Innovation Council (PMSEIC). This led to a major statement by the Prime Minister on innovation in that year, *Backing Australia's Ability*.

In practice, *Backing Australia's Ability* brought together a number of initiatives that had already been developed by the Government over a number of years, consolidating these into an overall framework, and adding some additional funding. Key initiatives brought together under the statement included:

- The *Investing in Growth* program, which combined government funds with approved venture capital companies to fund innovation, commercialisation and the exploitation of research, a program initiated in 1997;
- A revised and enlarged program for funding research in universities, as had been announced in 1999; and
- Several smaller programs concerned with developing research areas, and supporting commercialisation.

At the same time, the 2001 statement saw some additional funding allocated, including further increases to the money available through the Australian Research Council for its nationally competitive grants programs, and additional funding for centres of excellence and cooperative research centres. The Government also committed more support to measures to try to increase the numbers of students studying science and technology at the school and tertiary levels. While much of the funding for this new policy already existed, the Government announced a progressive increase in funding over a five-year period, commencing with an additional $159m allocated in the fiscal year 2001-2.

This combination of initiatives was seen to achieve three outcomes. First, it gave focus to the importance of innovation, and since 2001, the Government has published an annual *Backing Australia's Ability* statement. These reports give a summary of progress each year for the five-year program, together with publicising and showcasing innovation initiatives. A further element in giving focus to an innovation agenda was the establishment of a Science and Innovation Committee. This high-level committee has a membership which includes the Prime Minister, the Ministers of Science, Education, Science and Training, Finance and Administration, Industry, Tourism and Resources, and Communications, Information Technology and the Arts, together with the Chief Scientist. Its task is to give oversight to the implementation of the *Backing Australia's Ability* package.

Second, this initiative allowed the Government to link together a number of priorities and policies. In doing so, it has been able to take a more directive line in the allocation of funds, strengthening the articulation of policy. For example, in increasing the allocation of funds to the ARC for competitive grants, in January 2002 the Minister for Education, Science and Training, Dr Brendan Nelson, directed the ARC to allocate at least 33% of funds in the 2003 new funding round to four areas of priority:

1. Nano-Materials and Bio-Materials;
2. Genome and Phenome Research;
3. Complex and Intelligent Systems; and

- 4. Photon Science and Technology.

These were "identified as fields of existing or emerging research strength in which Australia can achieve international leadership and which have the potential to deliver significant economic and social benefits to the community".

Third, and mot important, it has enabled the Government to establish a stronger link between research and the exploitation of research, by more closely tying together those programs that fund research with those concerned with commercialisation, venture capital funding and the protection of intellectual property.

Initiatives in China

Since the process of opening up and reform commenced, China has set up a number of new mechanisms that are intended to tailor processes to the requirements of the socialist market economy and combines technology and economy. In particular, these have included:

- the implementation of a strategy of "rejuvenating China by science and education",
- the establishment of the national innovation system,
- the optimisation of the technological systems and structures available in the country,
- the development of an environment which is intended to bring the talented innovators and entrepreneurs in China to the fore and to encourage innovation and entrepreneurship, and
- the strengthening of the country's innovation capability

All these efforts have laid a solid foundation for the overall construction of a society with an improved standard of living, and the promotion of the new approaches to business and industrialisation. In addition, the commercialisation of technological innovations has become recognised as a critical new growth point in the economic development and plays a significant role in the upgrading of the industrial structures.

The Chinese government has set up a system of national technological programs (3+2), that comprises:

- the National High Technology Research and Development Program (known as Initiative 863),
- the National Scientific and Technological Task Force Program,
- the Key Basic Research and Development Program,
- the Research and Development Facilities Construction Program, and
- the Environmental Development Program for Technological Industrialization

This set of initiatives are linked together with a series of other smaller initiatives and programs. All of these programs have provided and created a major policy environment for the development of Chinese technology and the commercialisation of technological achievements.

Initiative 863, a strategic development plan for research and development is focussed on the development of Chinese high technology, setting priorities for high-tech research and development in 19 specific areas in 6 general areas of interest. These broader areas include information technology, biotechnology, new materials technologies, advanced manufacturing and automation technology, energy technology and marine technology, as well as other crucial programs. With the government's

guidance and enterprises' participation, Initiative 863 is actively engaged in promoting international exchange and cooperation in high-tech research and development. So far cooperative relationships have been established with over 20 countries and substantial cooperative programs involving some 10 technologically advanced countries have been initiated. Consequently, Initiative 863 has greatly contributed to the improvement of high-tech research, the strengthening of technologically innovative capabilities and the acceleration of technological transformation in key industries.

The National scientific and technological task force program, together with the task forces intended to tackle national socio-economic technological problems, is aimed at the improvement of the level of industrial technological sophistication. Critical technological breakthroughs, innovation in established technologies, the application and industrialisation of high technologies are together seen as important in providing technological support for the adjustment of industrial structures, sustainable social development and improvements in the quality of life. Science and technology are see as a source of great for change, particularly as they often provide leading edge innovation and new business opportunities. Science and technology have become the powerful driving forces for increasing economic growth, social efficiency and promoting socio-economic development. Based on figures available in Australia, during the four five-year plans since 1982, 539 programs have been launched, with almost 100,000 projects accomplished and, by the end of 1999, 15.34 billion yuan (RMB) worth of economic result had been yielded.

The national key basic research program (Initiative 973) is concerned with important basic research projects of global significance, with considerable potential for national development and technological progress. They are projects that are only viable with the government's vigorous involvement in their organisation and execution. Multidisciplinary and comprehensive researches have been carried out in the fields of agriculture, energy, information, natural resources, environment, population and health, and materials.

From 1998 to 2002, 132 initiatives were launched and the government expenditure on them during the period of the ninth five-year plan was 2.5 billion yuan (RMB). Most of the projects under the auspices of Initiative 973 have entered into various forms of cooperation with other countries.

The Spark program is the first government authorised program to promote economic development in rural areas by means of science and technology. The program supports, by using rural resources, large numbers of projects, which are characterised by having small investment, quick economic return, yet using advanced and broadly applicable technologies. With the support of the program, technology intensive areas and regional pillar industries have been established. Agriculture characterised by high yields, high quality and high efficiency has been developed. Socialized service systems in the country and rural scale-economy have been promoted.

The end of 1995 had seen the launching of a total of 66,736 projects under the aegis of the program, covering over 85 percent of all the counties. Of these projects, 35,254 had been completed. With the total financial input of the program at 93.76 billion yuan (RMB), an output value of 268.27 billion yuan (RMB) has been realized,

generating the profit tax of 47.39 billion yuan (RMB) and the foreign currency of US$ 8.89 billion. 127 national technology intensive areas, 217 regional pillar industries and 40 national training centres have been established.

The National Commission of Science and Technology executed the Torch program, a guiding program approved by the State Council in August 1988, to develop high-tech industries. The market-driven program undertakes to promote the commercialisation of high-tech achievements, the industrialization of high-tech commodities, and the internationalisation of high-tech industries. Development priority of the program is given to the fields of new materials, biotechnology, electronics and information, the integration of optico-machinery-electricity, new energies, high efficiency and power saving, and environmental protection. Under the guidance of the program, the construction of the high-tech areas, the service centres for the launching of the high-tech businesses, the management of the projects under the auspices of the program, the internationalisation of high-tech industries and the construction of software bases have all been brought up to a new level.

It is especially noteworthy that great progress has been made in the work on the innovation fund for the small- and medium-sized technology-intensive enterprises. In 1999, the number of the service centres nationwide reached 110 and, with nine more national centres authorized by the government, there were a total of 38 such centres. In addition, 30 national university science parks were set up, 15 of them validated by the Ministry of Science and Technology and the Ministry of Education as pilot parks. Also in operation were over 30 'business-launching parks' for those professionals with foreign academic degrees and over 20 software science parks. A variety of business incubators came into existence, including those concerned with special technical know-how, international enterprises, state-owned enterprises, and those especially for professionals with doctorates. The torch program has given a strong impetus to the commercialisation and the industrialisation of technological innovations, greatly enhancing the globally oriented development of high-tech industries.

Comparing initiatives in policy

There is a clear policy convergence between China and Australia**.** While it might be expected that the two countries would differ in terms of where they would fall along the continuum between being concerned with setting policy or actively participating in control over the use of resources, this turns out not to be the case. On the one hand, Australia is moving towards a more directive role than has been normal, and China is coming from a traditionally strong government policy direction role to one where it sees importance in creating an environment in which innovation and commercialisation can flourish. As a result, the two countries seem to demonstrate comparable levels of government intervention – while coming to the same point from different directions: as a result, they share a common approach to policy and regulatory structures. Indeed, in a number of respects programs and government mechanisms are remarkably similar.

In part, this may reflect the increasing importance of innovation and effective commercialisation for the broader economic and social development of all countries. Both China and Australia depend on effective business activity, and both need to

ensure they will be able to promote effective enterprises at a time of change, and global competition. This extrinsic demand may have played a larger role than political or ideological differences, an outcome indicative of the importance of globalisation in contemporary government policy.

While there are many similarities between the government initiatives of Australia and China, the development of company level support appears to be less similar. Corporate venturing and corporate innovation schemes are seen as one of the key business initiatives at the beginning of the 21st Century. There are a number of reasons for this, but in particular the recent focus on corporate innovation and entrepreneurship seems to be a result of:

- increasing global competition, and
- high rates of technological change.

In such an environment, the ability of larger companies to develop new products and services, and equally importantly to develop new business models has become critical. This approach is not new, of course, and many companies, like 3M in the USA, have been extremely successful in establishing systems that make the development of innovative and entrepreneurial approaches work inside companies. However, for many years the focus has been on product innovation., and the importance of continuous improvement.

In more recent years, there has been growing interest in 'business concept innovation', and the importance of developing new business models, especially as companies seek to move up and down the value chain of their products, as logistics becomes more significant as a competitive issue, and as information management and knowledge management play an increasingly important role in business (see Hamel, 2000, Sheldrake 2003).

Internal corporate support for innovation

One particularly interesting approach has been the development of internal systems for encouraging the development of new business areas. As an example, Orica Australia, a major chemicals company, developed an internal business development system – the Live Wire project – and it is indicative of a growing trend. The basic model for Live Wire is that all staff are encouraged to submit one-page new business ideas (ideas that develop or extend existing businesses, or improvement ideas are excluded – like most companies Orica has good systems to capture such thinking). New business ideas are scrutinised by a panel – including company and non-company members (to ensure that really innovative but promising ideas are not rejected), and those that are approved are moved on to a second stage (and the proposer rewarded with a cash bonus). The second stage is the development of a business plan, and panel acceptance of the business plan leads to a bigger cash reward, and the opportunity to develop the business. In its first two years of operation more than 50 innovative new business ideas were proposed, and a number were moving into the first stages of implementation.

There are a number of elements of the Live Wire approach that are worth examining. First, the model to establish an *internal market for ideas* had many strengths. By promoting throughout the Division, and by encouraging one page proposals that

captured the essence of a new business idea, the market was clear and easily accessed by anyone. Moreover, the combination of real financial reward with recognition for a idea that was accepted by a panel was clever way to meet both areas of achievement need – people in organisations like rewards, but they also like being given esteem within the company.

However, there was continuing debate among staff involved with Live Wire about the nature of the specific rewards and motivation. For many people, the really exciting opportunity was to be in on the ground floor of a new business, to play a role in its development, and to get equity in the new venture. Many companies, including Orica, are unwilling to take the step of allowing staff to take equity in a new business development, and this can be a disincentive for the more entrepreneurially minded staff of an organisation.

The debates about rewards and motivations continue all over the world. Some companies – like 3M – place great emphasis on individual drivers. Others – like Shell – place more emphasis on making sure the right capabilities are in place to drive a new business forward, and pay less attention to meeting the needs of the individual. While this debate is unlikely to come to quick resolution, it is likely that younger staff coming in to organisations (the so-called Generation X and Y staff) will be less willing to commit without personal recognition and reward, and this may influence programs in the future.

A second feature of the Live Wire program was the *need for support programs and mentors*. Organisations tend to discourage entrepreneurial capability in individuals – as they acquire a learned interdependence. Live Wire developed an excellent set of supporting programs, and gradually built up a mentoring support scheme as well. It is well recognised that the supporting infrastructure of an organisation must match the programs it is trying to develop and sustain. The implication from the Live Wire project is that a great deal of work has to be done to understand the nature of that underlying infrastructure, and how much may need to be done to ensure that the program will be adequately supported.

As companies seek to be more adaptive and flexible, the greater a challenge this will be. Proponents of markets are prone to ignore the essential nature of the framework in which the market operates (the legal system, market operation rules, etc), but without such a framework, markets don't work. Organisations need to build a systemic capability to support innovation and sustain entrepreneurial people – and systemic capabilities take time and resources to be established.

Research by one of my students in Southern China has revealed that systems like the Live Wire project are relatively uncommon. Many companies still rely on buying in technological innovations, and focussing on continuous improvement and technological developments within the business area. There does not appear to be a great deal of activity in the business concept innovation area, with companies rethinking the underlying model of business delivery itself.

Summary

The comparison between Australia and China in relation to support for innovation is revealing. At the government level, there is a surprising amount of similarity in programs and strategy. At the corporate level, there is a significant degree of convergence. These observations suggest that the next area for focus in China is likely to be corporate support for innovation. While many companies are successfully developing enhanced products and services, worldwide competition is encouraging more than continuous improvement. Chinese enterprises are likely to need a greater focus on radical innovation and the business concept innovation as global competition puts more emphasis on finding new ways to be successful, rather than winning on cost or quality.

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