

Review of the National Innovation System – Submission

Secretariat to the Expert Panel
Review of the National Innovation System
Department of Innovation, Industry, Science and Research.
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1. Background

Australia currently trades heavily in deficit even though our terms of trade are the best they have been for over 50 years. Commodity trade involves large volumes of raw materials which are of low value compared with moderately transformed or highly transformed manufactured goods. The main drivers of economic growth are is productivity due mainly to improvements resulting from the application of technology and the new creation of intellectual property and its application, particularly by adding value to lower value products.

It is in the long term national interest to trade in surplus not deficit otherwise there is a never ending loss of control of national assets. Economists argue that trading in deficit does not matter as long as overseas companies are willing to invest in Australia but what this view fails to recognize is that the control moves overseas and therefore most often decisions made are not necessarily in the Australian national interest. For a nation well endowed in resources like Australia, there is a strong temptation to use this wealth to live well and rely on imported international goods. Unfortunately this attitude has led to a burgeoning international private personal and private corporate debt which is balanced by a massive inflow of capital much of which is used to buy assets or invest in developing intellectual property which is owned by the overseas entity. Some capital is used to re-equip existing plants but these are often overseas owned. Entity purchase here is not balanced by Australian investment in overseas entities because the Australian funds are not available.

There is only one practical solution in the short term. This involves the painful reconstruction of a viable value adding manufacturing industry. The service industry provides 70% to our GDP but has not helped reduce our CAD to any large extent. We must create a value adding society, focused on innovation and education using our natural comparative advantages. Some of this can be in the service industry like education,

design, research, medicine, for example, but the opportunity is greater in manufacturing because some significant comparative advantages are there already.

It is essential in an advanced developed nation that equal opportunities are given to all talented people regardless of their profession or special skills provided that these are in the general national interest for the betterment of society. Increasing our manufacturing capability is one significant way of achieving this and broadening intellectual opportunity at the same time as improving our standard of living and balancing our trade.

Recent studies of productivity growth in Australia have revealed that the most significant contributor to productivity growth is *warehousing*. Warehousing does not add value to a community other than enable them to consume imported manufactured goods and perhaps employ a small number of people in the supply chain. This does not contribute to value adding for society even though it increases our GDP. One can argue therefore that the raw economic measure of productivity growth based on GDP is in error. After all, Italy once increased its GDP by 20% by suddenly estimating the size of the black-market and then claimed at that time that they were more productive than Britain.

We urgently need to develop an intellectual culture that values highly, skills in science and engineering that add to the wealth of society.

An innovation policy must aim to create wealth from industries and activities where, at least in the first instance, we have a comparative advantage. Later we can create such strategic advantages. Such an advantage must account for our natural resources in materials and people and position in the world aimed at competitive equilibrium but mindful of all moral sentiments.

This means we must develop an innovative system which enables small Australian owned businesses to tap in to the world's intellectual knowledge quickly and seamlessly and use the technological scientific and engineering resources available which are continuously upgraded with superior education facilities at school, colleges and universities. It is useless however to train more scientists and engineers if they have no job to go to. Barriers to business created by state bureaucracies must be removed.

Professional bodies can also play a significant role in the wider community. Scientists and engineers should no longer be invisible. A totally free market or completely unhindered free use of capital is not the answer as the current financial crisis has illustrated. A model similar to that in Denmark with a superior balance between the welfare state and Adam Smith's invisible hand and flexible security systems can improve Australian society significantly, but first we need to trade in surplus.

The government and Keynesian economics are the way forward. Incentives are needed in a truly cooperative system with an elevation of the need to create a new society focused on long term growth using science and engineering education and its application to innovative processes and products as a driver.

The current innovation system is not yielding the best result for the Nation. Much of this has already been enunciated in recent Productivity Commission reports and two recent parliamentary studies. It is not intended to repeat their findings here but the following facts are highly relevant to this current review of our National Innovation System.

1. Australia's trade balance continues to be negative and has been seriously so for at least the last 12 years. In fact the February CAD was approx \$3.3Bn, the highest ever recorded. The boom in exports of mined commodities has assisted but not rectified the problem or pushed the trade balance into largely positive territory. Our CAD has now reached the alarming level of 7% GDP. Economists claim that this does not matter as they continue to ignore our low savings rate and claim that a young country needs investment capital and hence we should expect a deficit in our current account. China also has a very great need for capital but trades in surplus and has a high savings rate which is used to invest in its own innovations and buy assets abroad. Australia's savings rate is one of the lowest in the developed world.

2. Our research and development expenditure as a percentage of GDP is low for as developed country and is mainly in the public sector by institutions such as the CSIRO. In the aggregate, private companies contribute little because of the poor R&D effort of many corporate overseas giants. Some small SME's contribute up to 20% of their turnover to R&D to remain ahead.

3. The CSIRO's contribution, whilst significant, unfortunately is too thinly spread in too many areas and in fact 50% of its expenditure on R&D in manufacturing is in areas where Australia does not have a comparative advantage and is therefore not used as effectively as it could. It is recognized that too sharp a focus can stifle creativity and inhibit the development of new products, however, we need a better balance.

4. The current Commercial Ready scheme in the past has been overly bureaucratic and the failure rate is high. Recent changes have been very beneficial. Historically, successful projects are rarely commercialized in Australia because of the reluctance of Australian venture capitalists to take a reasonable risk on innovative products and processes. VCs are focused on money so we need some sweeteners from government, tax concessions or matching grants.

5. Overseas ownership and control often results in ideas developed here being exploited overseas instead of Australia. This has occurred with three major Blakemore Consulting Innovations. Worse still, multi-nationals with operations in Australia tend to do their R & D closer to their head office.

6. Scientists and engineers are largely invisible in Australian society and comments made by those who wish to make public statements are not supported by those who control the media. Hence a lot of incorrect scientific information is spread about. Many journalists and economists are guilty of this. Such misinformation is probably due to the very poor understanding of science by the general population. Engineers and scientists have a good understanding of many technological problems, however because they realize they are

not experts, they are reluctant to make public comments. This vacates the stage for people with little or no understanding of the problem who are usually driven by ideology. Scientists and engineers need to stand up and be heard and need a strong advocate in government.

7. The CSIRO and Universities staff and equipment are not readily available to the general business community who therefore are unaware of the true capability of this resource and the untapped knowledge. R&D innovations need to be digested and promulgated to the business and general community.

8. Professional institutions like the Australian Institute of Company Directors and The Australian Institute of Management are not scientifically focused. Additionally, many companies do not have a scientist or engineer on the board and they have no policy on innovation.

9. Venture capitalists are reluctant to invest in technological research or they place unrealistic timetables to deliver outcomes. This is related to their lack of scientific understanding, risk aversion, and their short term focus and the fact that they do not understand the nature of the spin-offs that will occur. VCs are not risk averse in general but tend to take risks in the financial world which they believe they understand a little better.

2. The Current Innovation System.

The poor performance of our existing innovation system therefore has the following elements:

- A non integrated approach of the necessary parts needed to achieve success.
- Lack of cohesion and priority setting between the universities, private and public R&D centres, CRC's, and particularly SME's. Each commercialization project needs an effective leader who can bring together all the resources necessary to improve the probability of success. Perhaps the government should support SME entrepreneurs up front after rigorous project evaluation, and insist on payback only after success is achieved.
- Trying to be expert in too many industry sectors without a recognition that we have a significant comparative advantage in some areas but not others.
- A mining sector that has adopted a short term vision of maximizing short term profit by sacrificing downstream value adding activities. (e.g. the separation of BHP Billiton from OneSteel and Bluescope Steel). Maybe we need to tax them more heavily unless they contribute in a more cooperative way to downstream processing.
- The lack of simple mechanisms to raise capital by SME's in particular.
- The lack of mechanisms to retrieve knowledge from patents, universities and research establishments. With regard to patents, the information is available to some extent from IP Australia and overseas web sites, but it is not easy to access.

- A journal digesting and summarizing latest published applications and granted patents may make patent information more available to both business and technologists so the left hand knows what the right hand is doing.
- The lack of a suitable Australian journal for publication with a large number of fragmented journals all doing a piecemeal job. “New Engineer” attempts to do this but is under-funded and the circulation is poor.

3. Conclusion and Improvement Concepts

An innovation system policy should be needs driven and therefore focus on the following. It is recognized that tax and other incentives will be needed to implement many of these concepts.

- A long term innovation plan for the next 25 years, updated every year as circumstances change, sharply focused on rebuilding an economy which trades in surplus not deficit.
- Insisting that at least until our Balance of Payments problems are solved, programs of R&D are sharply focused on the national interest on value added activities where we have a natural comparative advantage, capitalize on our resources like minerals, sunshine, wind-power in the south, natural gas, bauxite to lightweight transport and aerospace components, high value technology and medical and scientific instrumentation for example.
- Focusing sharply on solar energy, photo-voltaics and wind power and cleaning up coal fired stations. We have already shown we can be world leaders in photo-voltaics (Suntec China), but the opportunity to commercialize was not supported.
- Supporting the focus of Government’s efforts to build cooperative networks in research institutions, universities, the CSIRO, TAFE colleges and industry.
- Encouraging Government to establish systems to enable a less costly access to professional staff at these institutions for industry
- Enabling quick and shared access to equipment, facilities and knowledge at universities and the CSIRO in the first instance
- Supporting industry leaders in science and engineering to offer services and experience to schools and educational institutions
- Rewarding process innovation equally as product development and applied and basic research.
- Encouraging industry to license intellectual property until they catch up
- Encouraging venture capitalists to invest in the commercialization of Australian intellectual property rather than risky opaque methods of financial shuffling
- Setting up cooperative research centres run by business people not academics (similar to Panasonic or the Irish model).
- Reinstating a more attractive tax regime for research effort in the private sector with special emphasis on commercialization particularly for Australian owned enterprises but offering less support for overseas owned entities unless they provide a plan to build our economy not simply ship profits back to the parent.
- Establishing a patent information referral centre like the original Australian Patent Information Service (APIS) and marketing its value to industry.

- Offering a graduated scale of R&D grants which are more attractive for targeted industries in the national interest where we have a defined comparative advantage but less in areas where such an advantage has not been established.
- The development of data base of all Australian expertise.
- Educating CEO's and board members so that innovation is firmly established on the board's agenda.
- Educating CEO's on how process innovation can pay for itself quickly and soon add significant value to the triple bottom line using demonstration projects.
- CRC's run with a business CEO or professional business oriented engineer or scientist, not an academic in charge, modeled like Panasonic, Sony, TDK, JVC., and the models in Ireland in particular using rapid development process and product innovation systems like Honda.
- Direct encouragement for manufacturers to continuously increase the value added component of their business following the principles ably practiced by Honda, Toyota, Panasonic, Canon, and encourage the use of point of sale digital data to accelerate process innovation and supply.
- Encouraging cooperative programs of research in Australia particularly with Japan.
- Measuring and rewarding R&D grants by output instead of input. We don't want to duplicate the ARC grant system to universities where excessive emphasis is given to academic publications and previous research grants. This leads to a "rich get richer" effect which makes it difficult for new players and ideas to get support.
- Increasing the awareness of scientific thinking in schools, universities and colleges and the wider community.
- Teaching the scientific method to all and demonstrating what science and its application can do for the finance industry.

A handwritten signature in black ink on a light blue background. The signature is cursive and appears to read 'John Blakemore'.

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