

Innovation is an integral part of a knowledge economy. While Australia is still reliant on resources and minerals to drive the economy, there are shining glimpses of young innovators paving the foundations of a knowledge economy. One only needs to look into the IT sector and more importantly in the science, technology, engineering and mathematics (STEM) disciplines to see the foundations of an innovation-driven economy.

In response to the terms of reference:

Currently, there does not seem to be a coherent body that promotes innovation, nor a premier award for innovation (see <http://www.innovators.org.nz/>). This body would raise the public and corporate awareness of innovation in Australia but will also encourage innovation in the country.

Further, in a recent oration by the head of the Wyss Institute, Boston USA delivered by Dr Donald Ingber as part of the Graeme Clark Oration series struck a chord with me. The comment Dr Ingber made about the US Federal Government funding the activities of the Wyss Institute to be specifically innovative, to conduct science and research at is at least 10-20 years ahead of the rest of the world. This was a significant tranche of funds towards what are considered high risk, high reward endeavors. This shows that the US Federal Government has the foresight to plan and lay the foundations of science, research and innovation beyond the current term of the current government. For Australia, there needs to be a paradigm shift from short-term and short sighted decisions to ones that are more long term. Many of the research projects I have been involved with do not have immediate outcomes that the media can digest (that are sexy and attention grabbing) they are however, incremental improvements and steps to a bigger goal, the elusive cure to cancer for example.

<http://www.graemeclarkoration.org.au/the-2014-oration.html> start watching at 12 minutes. And 35 minutes about DARPA <http://www.darpa.mil/default.aspx>.

Fundamental to establishing a culture and environment for innovation, I believe Government needs to start from grass roots, our children need to be inspired at an early level, about careers in STEM and to encourage children to take studies in STEM disciplines. While many children seem to aspire to become astronauts and doctors, this aspiration seems to wane as they progress through the education system. It is concerning today, because career prospects in STEM are limited and highly reliant on existing government funding schemes which are untenable. More and more PhD graduates are entering a limited grant funding system leading to a hypercompetitive environment where most exit STEM career pathways simply because there are no roles for them. There are fewer avenues still for graduates to move into the private sector. There have been studies in UK and USA tracking the career trajectory after PhD qualification where less than 0.5% of PhD graduates remain in the system and have academic posts. An equivalent study in Australia has not been performed but is likely to show the same trends as those in the UK and USA.

The Wyss Institute is a great example of how innovation can work and it involves the convergence of disciplines working together to achieve a wider goal/outcome. I would encourage the committee to watch this oration which covers work on the lung on a chip and robotic honey bees as examples of the convergence of life sciences with engineering and computer science. In isolation these disciplines are making incremental improvements within each respective field but together, far more can be achieved.

In terms of the current funding structures, the proposal for a dedicated fund for medical research was received with mixed emotions (I am a medical researcher) and I would suggest that more funds be focused on converging research and on incubators of innovation where the biologist, the engineer, the mathematician, the computer scientist are co-located within the same building. With the current funding structure (NHMRC and ARC), there is a segregation of disciplines by default and both structures focus too much on past performance (track record) rather than forward looking into the future (what will this work lead to?).

Innovative research leading to translated outcomes is challenging and there will be failures, the current funding system does not favour failures. Failures are outcomes too and have incrementally improved the field by informing how not to go about a problem. Without failure there is no innovation.

In terms of how the Australia can start to foster innovation in our economy I don't have an answer to this except to say to look at other countries who have poached or soaked up our brain drain. One only needs to look at the technology sections in our newspapers to read about inventions and innovations developed by Australians who then move overseas to develop their products further.

There is an existing incubator of innovation in CSIRO, where WIFI was invented, but there are many development programs that improve and innovate. It was disappointing to hear the funding cuts there, and the lack of support to the general science disciplines (that are not medical research). Can a Wyss Institute equivalent be developed here in Australia? Can the Australian Government support this?

My two cents.