Developing a Framework for the Assessment of the Australian Research System

Albert Patajo
A Research Project undertaken for the Australian National Internship Program
Presentation Overview

1. Background information
2. Establishing the framework
3. Applying the framework
4. Future research & concluding remarks
5. Questions
THE NATIONAL INNOVATION AND SCIENCE

National system to measure engagement and impact of university research

$9m  2016
Boosting the commercial returns from research
Measurement of outcomes

The Government will work with the research sector and industry to improve assessment of the research system, including improved metrics on engagement and knowledge transfer with industry, as well as research outcomes and impact.
Why do we need to assess the research system?
Problems with the current framework

Excellence in Research for Australia 2012

QS World University Rankings

HERDC: Higher Education Research and Data Collection
Establishing a holistic framework
Methodology
### Gross domestic expenditure on R-D by sector of performance and field of science

#### Sector of Performance
- **Total Intramural**

#### Units for Expenditure
- **National Currency**

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**Legend:**
-  National estimate or projection
-  Unrevised breakdown not adding to the revised total
-  Confidential

Resourcing
Research Expenditure as a Percentage of Gross Domestic Product

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<th>OECD - Total</th>
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<td>2004-2005</td>
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<td>2013-2014</td>
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Quality
Engagement
Return on Investment
Triadic Patents

Number of Triadic Patents Registered

- **2004**: Australia - 523, OECD Average - 1754
- **2006**: Australia - 364, OECD Average - 1629
- **2008**: Australia - 316, OECD Average - 1432
- **2010**: Australia - 305, OECD Average - 1393

*Graph showing the number of triadic patents registered from 2004 to 2010 for Australia and the OECD average.*
Responsiveness

*Australia’s Science and Research Priorities*
Policy Outcomes

**Strengths**
- Researchers
  - The quality of researchers in Australia is shown to be higher than the OECD
  - Furthermore, there is a strong research pipeline (HDR students) in Australia
- Publication & Citations
  - The quality of the research produced in Australia is higher than the OECD
- Efficiency
  - The cost of research for higher output is less for Australia

**Weaknesses**
- Financing
  - Australia does significantly poorly with its resourcing of the research sector.
- Commercialisation
  - There is a lack of translation of research into commercial outcomes.
- Intellectual Property
  - There is a decrease in the registration of Australian triadic patents, highlighting the issue of lack of commercialisation and IP innovation

**Opportunities**
- Industry Collaboration
  - Further collaboration with industry promotes greater commercialization
  - Australia has been doing well, but could continue to do better
- International Collaboration
  - It has been shown that greater international collaboration leads to higher quality research
  - Increasing international collaboration leads to greater outcomes such as more citations and commercial translation

**Threats**
- Sector Resourcing
  - Given that a large number of researchers work in the Higher Education sector and the Government sector, decreases in funding can significantly affect the research quality in Australia
- Citations
  - The number of citations per researcher has decreased. This could mean that the quality of research may be compromised if researchers begin to publish in lower journals to improve citation count.
Improving the framework

- Consistent data collection
- International comparison
- Centralised assessment centre
Future research?

- Indicator-indicator interactions
- Explaining trends
ANY questions?
Synopsis: Developing a Framework for the Assessment of the Australian Research System

Albert Patajo
Research completed during an Australian National Internship Program internship

Introduction
This research was conducted as part of the Australian National Internship Program (ANIP) and was conducted at the Australian Government Department of Education and Training. The purpose of the research was to develop a framework to assess research in Australia and this research examined various indicators that could be used to determine the health of the research system.

In 2014, the Abbott Government presented the Boosting the commercial returns from research paper. This discussion paper outlined a number of goals to improve the translation of research into commercial outcomes and a need to improve the assessment of the research system.

Developing the Framework
The current approach is a fragmented one, that focuses mainly on outcomes of research. Generally, the three main indicators used are: Excellence in Research for Australia, university rankings and the the Higher Education Research and Data Collection.

There are a few issues with these tools, firstly, they mainly examine outputs, which means it difficult to use this information for further improvements. Secondly, they assess parts of the system, such as universities, rather than the system as a whole. Lastly, the timing of these tools differ, which makes it difficult to make annually assessments.

The Department outlined 5 key indicators that could be used to develop a holistic framework. These indicators are based on key strengths of research systems internationally, as well as indicators that have been used in research assessments by other countries. This framework is useful for a number of reasons. It examines all aspects of the research system, not just output. Furthermore, this framework allows us to examine the relationship between different indicators and how they affect each other.
The indicators were:
• Resourcing of the Research System
• Quality of the Research
• Engagement
• Return on Investment
• Responsiveness

Applying the Framework

Resourcing
Resourcing examined how well research was funded and the human capital behind the research system. Australia trails behind the OECD average every year in the last 10 years in research expenditure. Conversely, Australia has a higher number of Researchers per capita (FTE equivalent) than the OECD average.

Quality of the Research
Quality of research examined the citations and publications of Australian research. The Australian Research system is of a much higher quality than the OECD average. Australian researchers have more publications per researcher and have a greater number of citations per publication.
Engagement

Engagement measured how well the research system engages with external stakeholders. Australia performs poorly when it comes to engagement with industry, with less than 1% of publications with an industry co-author. However, Australian researchers have consistently collaborated with international co-authors and this has produce strong publications that are in the 1% top highly cited publications.

Return on Investment

Return on Investment examined whether resourcing was being used efficiently or whether it was wasteful. Australia’s ROI on research is quite strong. Australia spends less money per publications than the OECD average, but still retains a higher citation rate per publication. However, Australian does poorly in commercializing this research, with low levels of patent applications.

Responsiveness

Responsiveness measured how well a research system can adapt to changing research priorities and how quickly it addresses regional and global challenges. This was difficult to measure, and there are no real tangible conclusions that can be derived.

Outcomes and Recommendations

Firstly, we have a strong researcher base here in Australia. In terms of human capital, it is very strong and the Government should start to invest more money in training new scientists and promoting science amongst young people to instil a culture of science. Secondly, the Government needs to promote links between university researchers and industry, as well as decreasing barriers to innovation. This has been somewhat done with the Innovation Agenda but as this is new, it is yet to be seen whether it is effective. Lastly, Australia needs to ensure it develops a coherent science strategy based on the above two recommendations to ensure a sustainable and strong science background.