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Canberra observed

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Decline in Australian research investment a real concern

On 15 September 2017 the Australian Bureau of Statistics published the Australian Gross Domestic Expenditure on Research and Development (GERD) for the year 2015–16.

It does not make for happy reading. The 2015–16 GERD is estimated at $31.2 billion, a decrease of $2.3 billion (7%) from 2013–14 investment. The GERD value as a percentage of GDP also continues to decline, from the peak of 2.25% in 2008–09. Table 1 shows the results from 2006 to 2016. The GERD/GDP ratio fell from 2.25% to 1.88% in 2015–16 and is now at its lowest level since 2004–05, when it was 1.73%.

In a country where governments have spruiked innovation and research, there is a lot of work to be done to restore our place as a clever country. Even though government investment has been reasonably constant over the last five years, the smaller science based agencies are suffering. For example, the ABS does not have the resources to properly measure these research investment parameters on an annual basis. In its September report (ABS 8104.0) it states: 'Following changes in the ABS work program for R&D statistics, it is no longer possible to derive a comparable estimate of GERD in the same manner'. This is code for 'We don't have the resources to do this properly'.

The agency had to use a predictive model to estimate the numbers for 2015–16, rather than actively gathering the raw data. This is better than nothing, but not an outcome to be proud of and is a situation that should never have been allowed to develop.

Table 1. GERD, by sector and as %GDP

	2006–07 $billion	2008–09 $billion	2010–11 $billion	2011–12 $billion	2013–14 $billion	2015–16 $billion
Business	12.64	17.29	18.01	18.32	18.85	16.66
Government	3.10	3.42	3.83	3.55	3.75	3.96
Higher education	5.43	6.85	8.16	8.89	9.92	9.55
Private non-profit	0.61	0.74	0.91	0.94	0.95	1.01
Total	**21 78**	**28 30**	**30 91**	**31 70**	**33 47**	**31 18**
GERD/GDP %	***2.00***	***2.25***	***2.19***	***2.12***	***2.11***	***1.88***

Data from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8104.0?OpenDocument.

It was revealed at Senate Estimates in October that over the next three years the ABS's funding will fall by approximately 10 per cent, at the same time as the demand for statistics is rising. Accessible, reliable, statistics form the basis for all future planning at the national, state and council levels and are crucial for any nation aspiring to prosper in the 21st century. The government should be increasing its funding, not inflicting death by a thousand cuts.

The GERD numbers in Table 1 cover the four main sectors. The key message is that while investment by the governments, Higher Education and Private Non-profit sectors has remained reasonably constant in dollar terms over the last few years, investment by the business sector has plummeted. The decline from 2013–14 to 2015–16 in this sector was $2.19 billion, or a massive 18%.

The manufacturing and the mining industries have experienced the brunt of the decline, presumably because of the fall in prices for mineral and petroleum resources and the collapse of car manufacturing. Figure 1 shows where the changes have taken place.

Manufacturing remained the largest contributor with $3.90 billion in 2015–16 followed by Professional, Scientific and Technical Services with ($3.75 billion or 23%), Financial and Insurance Services with $3.22 billion and Mining $1.88 billion. Together, these four industries accounted for more than three quarters (77%) of the total Business Expenditure on R&D in 2015–16.

Jobs in manufacturing plummet

The ABS 2016 census data released on 23 October 2017 also reveal the plight of Australian manufacturing. According to the ABS, the number of jobs in that sector fell from 902 829 workers in 2011 to 683 688 in 2016. No wonder the

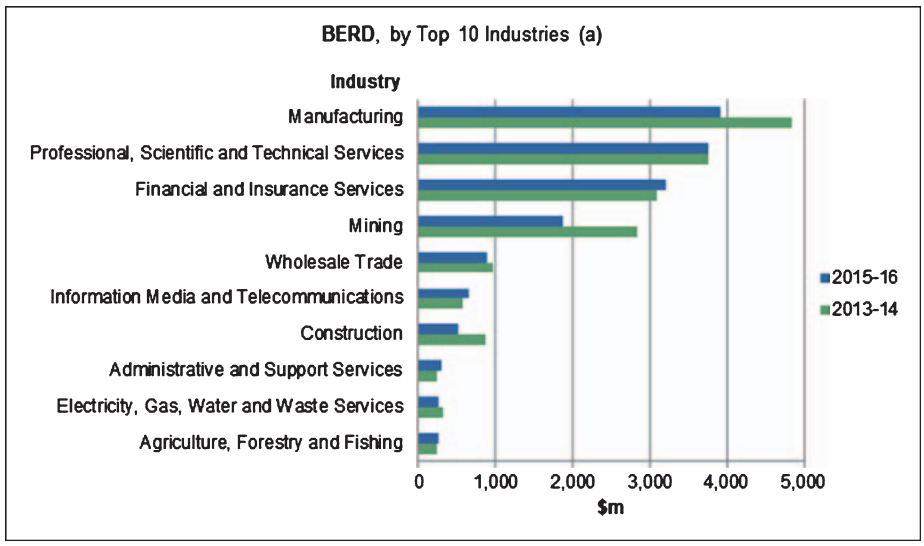

Figure 1. *Business Expenditure on R&D 2013–14 and 2015–16 (courtesy Australian Bureau of Statistics).*

Table 2. Top 25 countries ranked by GERD/GDP

Country	Year 2015	Country	Year 2008
Israel	4.25	Israel	4.35
Korea	4.23	Finland	3.55
Switzerland	3.42	Sweden	3.50
Japan	3.29	Japan	3.34
Sweden	3.28	Korea	3.12
Austria	3.12	United States	2.77
Chinese Taipei	3.05	Denmark	2.77
Denmark	2.96	Switzerland	2.73
Germany	2.93	Chinese Taipei	2.68
Finland	2.90	Singapore	2.62
United States	2.79	Germany	2.60
Belgium	2.46	Austria	2.59
France	2.22	Iceland	2.52
Slovenia	2.21	**Australia**	**2.25**
Iceland	2.19	France	2.06
Singapore	2.18	Belgium	1.92
China	2.07	Canada	1.86
Netherlands	1.99	United Kingdom	1.64
Czech Republic	1.95	Luxembourg	1.64
Norway	1.93	Netherlands	1.63
Australia	**1.88**	Slovenia	1.62
Canada	1.71	Norway	1.56
United Kingdom	1.70	Portugal	1.45
Estonia	1.50	China	1.44
Hungary	1.38	Ireland	1.39

Data from: http://www.oecd-ilibrary.org/science-and-technology/data/oecd-science-technology-and-r-d-statistics/main-science-and-technology-indicators_data-00182-en.

R&D investment in this sector dropped so significantly. Meanwhile, jobs in healthcare and social assistance (spanning sectors such as hospitals, GPs and aged and childcare) has boomed by 16%. It has solidified its position as the largest industry by employment, ahead of the retail industry, accounting for 12.6% of Australia's working population. I will leave the reader to judge whether the changing profiles are beneficial from a national perspective.

The mining industry is almost a minor player and ranks 16th in the ABS table that ranks the 18 largest employers. Its employment numbers have remained unchanged at about 180 000 over the five-year period since the 2011 census:

https://www.theguardian.com/australia-news/2017/oct/23/census-2016-manufacturing-jobs-in-australia-drop-24-in-six-years

How does our research effort compare with other countries?

Well not very well. The table on the left shows the GERD/GDP ratios for the top 25 countries listed by OECD for 2015, the most current year available, and 2008, when Australia reached its highest ranking. Notice how China and Korea have risen through the ranks, and although the United States has slipped from 6th to 11th, and the UK from 18th to 23rd, their GERD/GDP ratios have increased. Both Canada and Australia 'could do better' as a teacher's assessment might say for a lazy student. They have slipped both in the ratio and the ranking.

Because the methodologies in each country may be different for calculating both GERD and GDP, one must be careful when making comparisons, but overall the countries with the highest GERD/GDP appear to be the most successful.

It seems to me that if we are looking seriously to the future we must have an active and significant R&D sector. Even if it is just to evaluate and use technologies that have been developed overseas. If we cannot do that, we really will go down the tube. We can do better and somehow, we need to find a way to improve our performance.

Demand for gold declines but price remains solid

The third quarter of 2017 saw a 9% year-on-year drop in gold demand to 915 tonnes according to the World Gold Council (https://www.gold.org/research/gold-demand-trends). This is the lowest value since the third quarter of 2009, when the demand was less than 900 tonnes. It is a significant drop since the 1257 tonnes value of the 4th quarter of 2012.

The main reason for the decline was a fall in demand for jewellery, with Indian weakness largely being responsible.

On an annual basis, demand for gold in the last eight years has been between a low of 4227 tonnes in 2010 to a high of 4734 in 2011 with an average annual demand of 4432 tonnes.

Meanwhile, the price of gold in Australian dollars has risen steadily since 2009 from about $1200/oz to $1650/oz – an increase of 35%. A very sound return, as can be seen in the Figure 1.

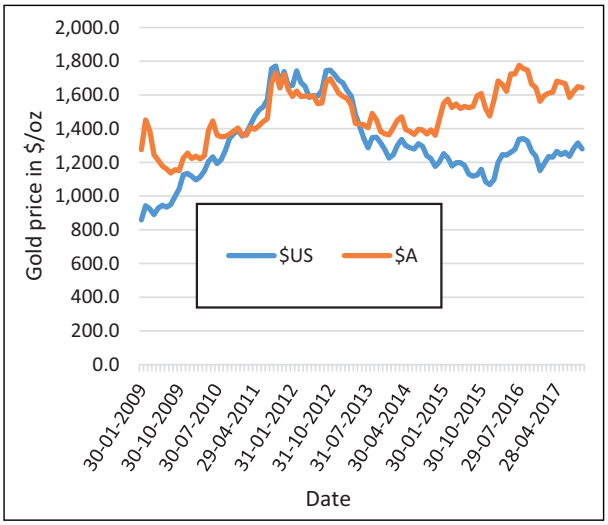

Figure 1. *Price of gold per quarter (not adjusted for inflation) from 2009–2017.*