

Economic benefit for Australia of a greater private sector investment in R&D

- 7.1 The Australian and New Zealand Association for the Advancement of Science (ANZAAS) told the committee that:

Historically, research and development played a vital role in Australia's economic and social development. Without research, primary industries (in both the agricultural and mining sectors) could never have become the great drivers of national development. Australian research and technological innovation have led to internationally important advances in industry, medicine and pharmacology.¹

- 7.2 The economic benefit to Australia from a greater private sector investment in R&D is generally stated to be of two kinds: prosperous firms and a healthy economy.² Their combination will lead to higher

1 Australian & New Zealand Association for the Advancement of Science Inc, Submission No. 37, p. 1.

2 Dr Robin Batterham (Chief Scientist), Transcript p. 466, quoting Lord Sainsbury, Britain's Science Minister: 'Business's ability to innovate is vital to its global competitiveness. It is only by continually developing new products, processes and services that business can gain the competitive edge necessary for the increasingly global economy. R&D is a key component of this, helping to generate the advances that lead to new value-added products and enabling people and capital to be more effective'; Mr Sergio Duchini (Deloitte Touche Tohmatsu), Transcript pp. 183-184: 'There has been a number of economic studies that have concluded that there is a clear link between technological progress and economic growth... One such analysis estimates that some 49% of economic growth comes from technological progress. Another found that, for every 1% increase in the nation's investment in R&D, there is an increase in productivity of some 0.23%'.

economic growth³ characterised by increased employment and increased export income,⁴ a more educated population,⁵ higher paying jobs,⁶ greater knowledge transfers,⁷ and greater tax revenue for the government from employees and companies.⁸

7.3 These considerations lie behind the Chief Scientist's vision of Australia providing the right conditions for 10% of Australian companies (50,000 companies) to become high-growth companies:

I want some 50,000 SMEs to grow from one to twenty employees to aspire to grow as have Cochlear, ResMed, Memtec and Radiata (the honor roll of Australian-born global companies...

By growing ten times the number of home grown globally focused companies, the chances of Australia creating a global brand of the ilk of Nokia, increase significantly. The result would be a massive increase in export dollars.

Australia's aim should be to get as many of our companies as we can to the top end of the scale for global SMEs. From that position they can either be sold at a handsome profit, or else go on to become a world brand. Either way the benefit is great for Australia.⁹

-
- 3 Ms Heather Ridout (Australian Industry Group), Transcript p. 118: 'We identified increasing our R&D effort as one of the fundamental steps needed to drive strong economic growth in Australia'; Australian Paper Council, Submission No. 44, p. 6: 'Innovation generates gains in productivity, spawns new industry and transforms existing businesses'; Dr Stephen Sykes (Flavourtech Pty Ltd), Transcript p. 457: 'If private R&D expenditure was increased in both absolute and relative terms, we would expect to see increased economic growth due to a better balanced, more efficient and more effective national innovation system'.
- 4 Prof. Peter Gerrand (Council for Knowledge, Innovation, Science & Engineering, Victoria), Transcript, p. 80.
- 5 Mr Don Larkin (Australasian Institute of Mining and Metallurgy), Transcript, p. 58: 'The challenge for the [mining] industry and the Australian government is to attract these major [international] corporates, which make decisions on a global basis, to invest in R&D in Australia. The flow-on effects from that will be in the education sector, where we can provide the human capital or the skills resources for these global companies to practice world-wide'.
- 6 Mr Robert Muir (Australian Nuclear Science & Technology Organisation), Transcript, p. 355.
- 7 Mr John Latham (Pfizer Pty Ltd), Transcript, p. 371.
- 8 Mr Robert Muir (Australian Nuclear Science & Technology Organisation), Transcript, p. 350.
- 9 Dr Robin Batterham, Submission No. 25, pp. 1-2.

- 7.4 The presumption that greater BERD produces prosperous firms needs to be qualified by the realisation that the driver of R&D in any business is profitability (see chapter 5). BERD ‘is an investment and will ultimately be driven by perceived returns in the marketplace’,¹⁰ meaning that a rational business will only increase its expenditure on R&D if it perceives that to do so will increase its profitability:

We see we will make more money out of spending on R&D than out of not spending it, and this is why we do it.¹¹

- 7.5 The Federation of Australian Scientific and Technological Societies (FASTS) stated that:

There have been a number of studies over the last six to ten years which, in a number of major OECD countries, have shown that the return on investment in R&D is of the level of 25-30% direct return [to the individual firm]. Then there is an additional rate of return, which is another 25% on top of that, to raise it to the order of 50-60% return. That is known as a “social rate of return” whereby the indirect benefits of that research, which perhaps were not even envisaged by the original researcher, are captured by other people and turned into new products and new technologies.¹²

- 7.6 FASTS added, however, that it can ‘take five years to realise’ these sorts of returns.¹³

- 7.7 As noted in chapter 2, a higher level of BERD does not necessarily equate to higher productivity—and it is the latter that enables an economy to grow. While R&D can deliver massive productivity gains,¹⁴ this is not necessarily the case. However, BERD is an important part of the innovation system that ‘is ultimately the source

10 Mr Terrance Lowndes (Commonwealth Department of Industry, Tourism and Resources, Transcript, p. 213.

11 Dr James Fox (Australian Innovation Association), Transcript, p. 181.

12 Dr Ken Baldwin (Federation of Australian Scientific & Technological Societies), Transcript, p. 28. Also Commonwealth Department of Industry, Tourism and Resources, Submission No. 38, p. 3: ‘The OECD has demonstrated that R&D contributes to output and total factor productivity growth, and the Productivity Commission estimates that the social rate of return on Australia’s R&D is 25-90%. Private R&D expenditures can generate significant spill-over benefits to the economy justifying government intervention to increase investment in R&D and ultimately to increase economy-wide welfare’.

13 Dr Ken Baldwin, *ibid.*, p. 29

14 Mr Richard Clark (Ericsson AsiaPacificLab Australia), Transcript, p. 300.

of economic benefit' via productivity growth,¹⁵ reflecting the findings of many studies suggesting that innovation is 'the single most important ingredient in any modern economy'.¹⁶

- 7.8 Further, the presumption that greater BERD produces a healthy economy needs to be qualified by noting that the economy will suffer if firms undertake unprofitable R&D which generates no return. The Productivity Commission observed that 'more R&D is not necessarily better—either better R&D or better for the economy'.¹⁷ The representative of a major international corporation thought that many firms did not sufficiently query even the level of R&D that they were currently undertaking:

You have to challenge that, if your R&D does not get to an outcomes base—whether that is a better quality of life, or a product or a service—then, overall, what is it for? I do not think we are challenging that enough, to be quite honest.¹⁸

- 7.9 Just as firms need to carefully appraise any decision to increase their R&D activity, so governments need to appraise the effect of their incentive measures to ensure that a healthier economy is indeed the outcome. This is further commented upon in Chapter 10 of this report.
- 7.10 Witnesses drew attention to the economic benefits of particular sectors of the Australian economy that undertake a high level of R&D. One such sector is mining which does the world's best R&D¹⁹ and which massively contributes to the Australian economy: 'the mining technology and services sector... generates about \$2 billion of business a year'.²⁰ The benefits of mining R&D spill over to other sectors of the economy, for example the research into 'cleaning up the mess' from mining activity has led to the development of software and techniques that are 'worth more than the actual materials that were invested'.²¹

15 Mr Terrance Lowndes (Commonwealth Department of Industry, Tourism and Resources), Transcript, p. 213.

16 Mr Mehrdad Baghai (CSIRO), Transcript, p. 237.

17 Mr Gary Banks (Productivity Commission), Transcript p. 481.

18 Mr Warren King (Raytheon Australia Pty Ltd), Transcript p. 623.

19 Prof. Tim Napier-Munn (Australasian Institute of Mining & Metallurgy), Transcript, p. 58.

20 *ibid.*, p. 59.

21 Mr Toss Gascoigne (Federation of Australian Scientific & Technological Societies), Transcript, p. 30.

- 7.11 In a similar vein, a major international pharmaceutical company stated that the ‘spin-off benefits’ of the pharmaceutical industry:
- ... were around 4,500 jobs and \$550 million worth of benefits that went out into the community [as well as] export products worth around \$450 million [and a similar level of local sales].²²
- 7.12 Further, the committee was told that the multiplier effect of one dollar of government support for the automotive industry (by way of investment in the Automotive Competitive Investment Scheme or ACIS) ‘was in the order of seven or eight times that investment’.²³
- 7.13 The CSIRO told the committee that independent research showed great benefits from its R&D:
- Benefit-cost evaluations of CSIRO projects show significant returns:
- 17 manufacturing projects had benefit-cost ratios ranging from 0.5 to 72;
 - seven minerals and energy projects had benefit-cost ratios between three and 39;
 - 12 environment projects had benefit-cost ratios from 0.3 to 29;
 - 29 agri-business projects had benefit-cost ratios of 0.4 to 236.
- Results for the four more recent projects were that: Robotic mining had a benefit-cost ratio of 96 and an internal rate of return of 720%; the RoadCrack project had a benefit-cost ratio of 91 and an internal rate of return of 45%; the aXcess Australia low emission vehicle project had a benefit-cost ratio of 130 and an internal rate of return of 51%; the Vesta bushfire control project had a benefit-cost ratio of 81 and an internal rate of return of 70%.
- The report concluded that the present value of anticipated benefits from just four successful current triennium projects will be many times CSIRO’s total triennium funding.²⁴

22 Dr Mark Tennyson (Merck, Sharp and Dohme Australia Pty Ltd), Transcript p. 331.

23 Mr Sergio Duchini (Deloitte Touche Tohmatsu), Transcript, p. 193.

24 CSIRO, Submission No. 22, p. 20, citing the Centre for International Economics *Assessing the Contribution of CSIRO*, November 2001.

Conclusion

- 7.14 The committee considers that the economic benefit to Australia from a greater private sector investment in R&D is considerable, though there are limits to the amount of BERD that businesses will outlay, the principal one being set by the perceived returns in the marketplace.