Towards 3%:Turbocharging Australia's Innovation Effort:

Paper 2: Why business expenditure on R&D has collapsed

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From 2008 Australian business R&D collapsed. This Paper sets out to find out why.

# What the data tells us

From 1981 to 1995, Australian businesses made steady progress in lifting the proportion of R&D in GDP. When the across-the-board tariff cuts announced in 1988 came into effect, the proportion dropped and then recovered progressively, reaching 1.37% in 2007. The collapse associated with the GFC pushed the proportion back to 0.92% in 2019. Trends are shown in Figure 1.

Figure 1: Trends in business expenditure on R&D 1992-93 to 2021-22

$m inflation adjusted.



Source: ABS, *Research and Experimental Development, Businesses, Australia*, various years.

The trends in Figure 1 point to:

* The largest fall in R&D was in the *Energy* sector, principally by fossil fuel companies.

Some have suggested that these companies moved away from exploration to concentrate on extraction, reducing the need to develop new technologies[[1]](#footnote-1). Another explanation is that they stopped investing in fossil fuels and switched to investing into new businesses, such as alternative energy R&D—but not in Australia.

* *Mineral Resources* R&D also declined, also suggesting that global miners have cut back on their R&D commitment. But, also like the energy companies, they are conducting their R&D elsewhere.
* Although the GFC hit *Information and Communication Services* R&D hard, there was increased R&D investment from 2012-13. Rapidly growing companies like Atlassian, WiseTech, and Xero are heavy R&D investors, although not all of this occurs in Australia.
* R&D investment in *Commercial Services and Tourism*, which includes banking and finance,held up after the GFC but had fallen significantly since 2015-16, recovering again from 2019-20.
* *Manufacturing* R&D, which had recovered from the tariff cuts in the 1990s, fell by a relatively small amount after the GFC. It has taken a fall since 2019-20, suggesting that the COVID-19 influence was at play.
* R&D in other industries, including Construction, Environment, and Agricultural production, is relatively small, and movements have not influenced the overall R&D trend. Again, global corporations invest heavily in R&D in these industries, but not much is undertaken in Australia.
* *Defence* R&D does not take on the significance it has in the US and many other countries.
* Without the rapid growth in *Health* R&D, where CSL is a large player, the situation would be even grimmer.

# Beyond the data: what’s really going on

The following observations are propositions, or hypothesis, that require testing with further inquiry and analysis, particularly before they become a foundation for policy action.

## The imbalance in the Australian industrial structure

Thirty-six Australian companies rank in the *Forbes Global 2000*. In terms of sales, half are in the finance and retail sectors, which contain businesses not known for their R&D intensity, although the “Big 4 banks” are all included in a list of the top 1,000 global R&D investors.

A further 38% are in resources, which undertake little reported R&D.

Only 10% of the Australian *Forbes Global 2000* are in sectors that are usually considered to be R&D intensive—technology, medical, and manufacturing.

However, currently, there are only 16 technology intensive companies in the ASX 200. In 2022-23 these companies, listed below, had a combined R&D expenditure of $A3.4 billion and R&D intensity of 11.4%.

| Company | Sector | R&D ($M) | Revenue (B) | RD Intensity |
| --- | --- | --- | --- | --- |
| Aristocrat | Technology (games) | 834.70 | 6.30 | 13.30% |
| Computershare | Technology | 577.00 | 4.81 | 2.00% |
| Xero | Technology | 495.80 | 1.31 | 6.80% |
| TPG Telecom | Technology (Communications) | 405.00 | 5.53 | 7.30% |
| Light & Wonder | Technology (games) | 334.50 | 4.26 | 7.90% |
| WiseTech | Technology | 185.80 | 0.82 | 22.70% |
| Seek | Technology (online marketplace) | 151.70 | 1.23 | 2.40% |
| Life360 | Technology (platform) | 148.10 | 0.45 | 33.20% |
| Webjet Limited | Technology (online booking) | 74.90 | 0.36 | 20.60% |
| Codan Limited | Technology | 46.55 | 0.46 | 10.20% |
| Altium | Technology | 44.34 | 0.40 | 11.20% |
| Technology One | Technology | 34.06 | 0.43 | 7.90% |
| SiteMinder | Technology (platform) | 29.82 | 1.15 | 19.70% |
| Reliance Worldwide | Technology | 17.79 | 1.87 | 1.00% |
| Macquarie Technology | Technology | 8.94 | 0.35 | 2.60% |
| Audinate Group | Technology | 8.68 | 0.07 | 12.50% |
| NEXTDC | Technology (data centres) | 8.29 | 0.06 | 2.30% |
| Totals |  | 3,405.95 | 29.83 | 11.42% |

Source. ASX, <https://finbox.com/LSE:GLEN/explorer/rd_exp_margin>

In 2022-23 Atlassian, which is listed on the NYSE reported spending $2.8 billion on R&D (52.9% of revenue). Very little of this is spent in Australia. In Communications, Telstra has a market capitalisation of $44 billion, does not publicly report its R&D expenditure.

Six companies in the health sector reported a combined R&D expenditure of $2.9 billion with a R&D intensity of 9.6%. Eleven companies in manufacturing reported a total R&D spend of $381.6 million, with a R&D intensity of 0.55%.

Technology, health, and manufacturing are fundamental to Australia’s Industries of the Future. They are currently driving business R&D growth (see Figure 1 above), but these existing players and new ones will need to grow faster to shift the needle away from reliance on the resources sector. .

## Falling Government support for R&D

Compared to most other countries, Australian support for business R&D has been falling since 2013, having increased for a while after the GFC. Figure 2 shows an upward trend in 2020 due largely to increased access by SMEs to the Research and Development tax incentive (RDTI).

Figure 2: Government budget and tax incentive support for business R&D

as a proportion of GDP 2000-2020 (%)



Source: OECD (2024), Gross domestic spending on R&D (indicator). Doi: 10.1787/d8b068b4-en (Accessed on 09 February 2024)

Australia’s low level of R&D support makes high-risk R&D relatively unattractive for both domestic and international companies. Not only that, but Australian companies might also be motivated to invest where government support is greater. This factor is understood to be at play for new technology-based firms looking to grow.

## An unsupportive and unstable business investment climate

Between 2008 and 2022, the policy climate for Australian business R&D was characterised by disinterested governments and confusing policy signals. During this period, there were 14 different Ministers who had portfolio responsibilities for industry, science, and innovation. These Ministers[[2]](#footnote-2) usually ranked at the lower end of the Cabinet pecking order.

The period was characterised by a regular grab bag of new initiatives (“funding programs”) with very small amounts of money and very short half-lives, almost continuous machinery of Government (MOG) changes, and public service “efficiency dividends” that killed off policy capability, corporate memory, and promoted transactional government-business relationships.

Underpinning these trends was the Rudd Government’s proposed Resource Super Profits Tax (RSPT), which generated significant opposition in the Minerals and Energy Sector and may also have influenced future R&D investment location decisions.

## The globalisation of corporate R&D

As the world becomes increasingly interconnected and interdependent, multinational and global companies see their core skills in identifying challenges, envisioning the future, and coordinating resources to best attack the problem. In this context, they decide where and how to source R&D capability.

Decision frameworks address countries’ strengths in talent, research capacity, ease of doing business, potential partnership arrangements with universities and public research organisations, trust, and government support.

For example, in the agriculture sector, companies like Bayer, Syngenta, and BASF have global R&D programs, and countries compete intensely to host them. In 2022, Bayer reported over 700 international collaborations, of which only twelve were in Australia[[3]](#footnote-3). In 2019, Bayer generated sales of A$1.3 billion in Australia and New Zealand (out of a total of $69.6 billion). Its global R&D spend was $8.5 billion[[4]](#footnote-4).

Australia is currently uncompetitive in the global R&D attraction business. It has not developed a Foreign Direct Investment (FDI) policy to attract R&D investment.

## R&D is becoming harder to do

US Research has shown that returns to companies’ R&D spending have declined by 65% over the last 30 years[[5]](#footnote-5) . It also shows that while R&D within industries gets harder over time, as investment opportunities dry up, companies respond by entering new industries with greater technological opportunity.

While some industries may be doomed (like fossil fuel energy production), companies aren’t. They move into industries with greater opportunity, while exiting the industries that don’t.

This has implications for measured R&D, as fossil fuel companies switch to investment in renewables, but do not commit to undertaking R&D in the new companies they create in Australia.

These companies are, however, likely to be the sort of businesses that Australia needs in developing the Industries of the Future.

## The growing sophistication and cost of digitised R&D

Business researchers, particularly medium-sized businesses with the potential to grow through R&D, often require access to sophisticated and expensive digital hardware and software to undertake and complete research projects.

The initial cost of these investments can be a significant barrier to undertaking R&D. Costs also arise in accessing testing and scale-up facilities (where they exist) and the requirement for specialised skills.

In the manufacturing sector these digitally enabled technologies include high-performance computing, 3D printing, CNC machines, robots and cobots, laser cutting, IoT sensors, AI quality control systems, AR/VR systems, HPC systems, advanced metrology equipment, PLM software, CAD/CAM software, and chemical analysis and material characterisation instruments.

The impact of this barrier on business R&D is an issue worthy of further exploration, given that Australia once had an “access to major research facilities” program.

## The gravitational pull of globally oriented regional innovation ecosystems

Australia has a strong seed and early-stage venture capital industry sector, but access to later-stage growth funding is scarce, particularly for narrowly conceived niche projects. State Governments have tried to fill a gap in this area.

Venture capital firms like to invest at scale in building R&D start-ups (e.g., pharmaceutical or software start-ups). Those investments tend to be made where the innovation ecosystem is strong—San Francisco and Boston, for example.

Australian-formed and growing technology companies that have grown to global status, such as Atlassian, undertake their R&D in regional innovation ecosystems like Palo Alto, India, Boston, Oxford/Cambridge.

Some fast-growing technology start-ups have chosen to maintain their head offices in Australia but source their R&D internationally.

## Privatisations, mergers, and acquisitions

It is likely that the privatisation of energy production and distribution corporations, particularly in NSW impacted significantly on R&D investment. Even when in public ownership, government business enterprises, R&D expenditure was classified as business R&D

When government-owned, business enterprises tend to invest profits in R&D. When privatised, surplus profits are returned to shareholders. There is very limited information about how privatised enterprises are committing to R&D in renewable energy.

The largest energy suppliers in Australia are Origin Energy, AGL Energy, and Energy Australia. None of these companies, which absorbed the State-owned suppliers, mention research or R&D in their Annual Reports. In 2022, Snowy Hydro reported a $0.5 billion R&D offset.

Australian Defence Industries was privatised in 1999, passing from government ownership to the French defence company Thales. Thales undertakes research globally, locating activities where it can secure the best deals with host governments and research organisations. At this stage, not much of this R&D comes to Australia.

Recent research has suggested that privatised firms focus on a narrower set of technologies as a response to increased pressure for profitability and short-term results. Privatisation will also increase the extent to which they collaborate with external inventors, both locally *and* internationally.

## Knowledge and skills shortages

Universities and TAFE/VET institutions face challenges keeping pace with the sheer speed of technological advances. They can sometimes be slow to update their curriculums, leading to a skills gap in which graduates may not have the latest knowledge required by employers.

Moreover, there is a growing requirement for interdisciplinary programs that combine technical skills with domain-specific knowledge, preparing students for the complexities of modern R&D projects.

The newly established Tech Council acknowledges this problem, but there is a lot of catching up to do.

## Investor pressure for shareholder value

Publicly listed companies are constantly under pressure to maximise shareholder value, which can compromise investments in R&D. The pressure comes from shareholders, financial markets, risk-averse boards of directors, executive compensation structures, and regulatory requirements.

Capturing shareholder value has become a driving factor in the acquisition or takeover of Australian businesses by multinational corporations and private equity firms. R&D is cut back or eliminated entirely unless it offers a compelling, distinctive capability that can be nurtured locally.

Australian Boards have been interested in, and CEOs are rewarded for, increasing their share price and shareholder value. This incentivises boards to use profits for share buybacks rather than global growth through R&D.

# Reversing the slide

Reversing the slide in Australia’s R&D will involve addressing these underlying causes. Recent advocacy for lifting R&D has only addressed symptoms of the problem and made the task look easy.

Reversing the slide will be the subject of the next Paper.

1. AlpaBeta, 2020. *Australian Business Investment in Innovation: Levels, trends and drivers*. A report prepared for the Office of Innovation and Science Australia. <https://www.industry.gov.au/sites/default/files/2020-02/australian-business-investment-in-innovation-levels-trends-and-drivers.pdf> [↑](#footnote-ref-1)
2. The Ministers were Kim Carr (twice), Greg Combet, Chris Evans, Chris Bowen, Craig Emerson, Ian Macfarlane, Christopher Pyne, Greg Hunt, Arthur Sinodinos, Karen Andrews, Christian Porter, Angus Taylor, Melissa Price and Scott Morrison. [↑](#footnote-ref-2)
3. <https://www.bayer.com/en/sustainability/transparency-in-science-collaborations> . [↑](#footnote-ref-3)
4. <https://finbox.com/DB:BAYN/explorer/rd_exp_margin> [↑](#footnote-ref-4)
5. Anne Marie Knott , “R&D Getting Harder, or Are Companies Just Getting Worse at It?” Harvard Business Review, March 21, 2017. <https://hbr.org/2017/03/is-rd-getting-harder-or-are-companies-just-getting-worse-at-it> [↑](#footnote-ref-5)