



@AuManufacturing

Powered by the Australian Manufacturing Forum

*Australia's R&D Crisis – Towards 3%*

# INDUSTRY'S STRUGGLE FOR INNOVATION

Published by @AuManufacturing news and Media.  
[www.aumanufacturing.com.au](http://www.aumanufacturing.com.au) | June, 2024

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**“**  
**We have an  
opportunity to  
reshape our  
national innovation  
ecosystem**



# FOREWORD

*In our daily conversations with manufacturing clients and industry contacts, it's clear that Australia's disparate, multi-layered and siloed approach to innovation is congesting the way forward with red tape.*



**Ryan Pollett**  
National Leader,  
BDO Manufacturing  
& Wholesale

The result is an ongoing fall in R&D spending that hampers our national innovation efforts and leaves us at serious risk of losing the knowledge and skills we need to protect our sovereign capabilities and remain internationally competitive.

Given this, the decision to support the Towards 3% R&D—Turbocharging Australia's Innovation Effort campaign was an easy one. @AuManufacturing is to be commended for taking the initiative to tackle this complex and vitally important issue in a collaborative and meaningful way.

As providers of genuine news, commentary and analysis specifically for Australia's manufacturing sector, @AuManufacturing is an ideal platform for

open, robust conversations – such as this one – which have enormous implications for the industry's future.

The calibre of experts from industry, academia, and government who have contributed to this eBook and the series more broadly is second to none. Their submissions have resulted in a comprehensive collection of thought leadership that not only illustrates what has gone wrong but—importantly—offers potential solutions to our innovation crisis and points the way to a brighter future.

We encourage Australia's industry leaders, politicians and policymakers to give serious consideration to the issues and ideas raised by the contributors to this eBook. The submissions are diverse, thought-provoking, insightful and broadly optimistic – but also firm in the shared message that we must do better.

International examples show us that where a sense of urgency and a national imperative exist, turbocharged innovation efforts follow. The US, China, and Europe—among others—are throwing huge sums of money at the issue, and we must move now to prevent being left behind.

We have an opportunity to reshape our national innovation ecosystem in a way that streamlines, supports, and prioritises local development and commercialisation—let's seize it.

We hope you find the series articles and eBook as informative as we have. We thank @AuManufacturing for their efforts and for the opportunity to be involved.



**Nicola Purser**  
National Leader,  
BDO R&D and  
Government Grants

# EDITOR'S NOTE

## *Exploring the challenges and solutions for Australia's innovation decline.*

Through April and May, 2024 @AuManufacturing news published a series of opinion articles crowd sourced from readers and members of the Australian Manufacturing Forum LinkedIn group articulating the issues around a drastic slump in Australia's innovation effort over the past 10 years, as measured by R&D.

Every nation and every company must invest a portion of their income on innovating for the future – or they condemn themselves to irrelevance and economic decline – Australia has a target of spending 3% of GDP on R&D.

However R&D effort has fallen from 2.2% of GDP just over a decade ago to 1.68 percent now – well below the OECD average of 2.8 percent, not to mention leading countries like Korea, Israel and Switzerland with expenditures of up to five percent.

While Australia has been 'lucky' to date relying on iron ore, coal and gas – our industry mix is unsustainable if we are to remain a wealthy .

We asked readers what is going right and wrong with our innovation system, and how to fix it and we received around 40 substantial contributions – of which @AuManufacturing published 27 which are summarised in this special e-book. Refer to the original articles for the full versions.

Australia urgently needs to organise and co-ordinate its innovation efforts, though there are some opportunities driving innovation such as defence, the energy transition and space.

Thanks to everyone who contributed. Thanks especially to Dr John Howard of Howard Partners who undertook original research for the series, and to Emeritus Professor Roy Green of UTS, Sydney for his advice and support.

And finally thanks to our generous sponsors who have made this series possible - our principal sponsor BDO, a leading provider of audit, tax and advisory services which made publication of this e-book possible, and R&D tax incentive consultancy Michael Johnson Associates.



**Peter Roberts**

*CoEditor and CoFounder*

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## About the cover

Collaborating with our creative agency, Studio Riz, they were inspired by our retelling about Australia's innovation struggles over the last 50 years. Using advanced AI image generation tools, Studio Riz brought this concept and other images in this eBook to life. For this image they drew inspiration from vintage boxing posters to depict our ongoing battle. The robot symbolises innovation and the upward battle against 'the suit', representing our political challenges.



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# THE STATISTICS DO NOT LIE... INNOVATION IN FREEFALL

*The facts about the slump  
in national R&D effort  
over the past decade.*



**Dr John Howard**

*Executive Director, Acton Institute  
for Policy Research Innovation and  
Visiting Professor at UTS Institute  
for Public Policy and Governance*

Australian R&D investment is in a poor state: Business R&D has collapsed, and the government has failed to support R&D in its own research facilities.

The result - in 1981, Australia spent 0.90% of its GDP on R&D – the lowest among its major trading partners Japan, Korea, the UK, USA, China, and Taiwan.

Forty years later, in 2021, the proportion is still the lowest, at 1.68%.

Not only that Australia is falling further behind in its commitment to R&D – government has set a 3% 'benchmark' for national R&D spending.

Over the 40-year period, things looked good until 2008, when Australian R&D reached a peak of 2.24% of GDP which was close to the OECD average of 2.28%. Then it collapsed.

A collapse in business R&D, together with a trend decline in government

expenditure on R&D since 1995, has been the major source of Australia's R&D problem.

## **Business**

In Australia, as in most other countries, the business sector undertakes the largest proportion of R&D in GDP, but that proportion peaked in 2008 – at 1.37% – and has declined to 0.92% in 2019.

In 1981, the Australian proportion was 0.23% of GDP and increased to 1.37% in 2008 (OECD average of 1.57%). But by 2019, it had fallen to 0.92% – half the OECD average of 1.84%.

Most countries progressively increased their business R&D commitment after the GFC (2008).

This The collapse in business R&D occurred entirely in large companies. Globally, within this large company cohort, business research and development investment is heavily

concentrated in the motor vehicle, pharmaceuticals, and technology industries.

Australia no longer has any global motor vehicle companies doing R&D in Australia, and only one indigenous global pharmaceutical company (CSL).

## Government

It is disappointing that the proportion of Government expenditure on R&D has fallen from 0.41% of GDP in 1981 to 0.17% in 2020.

This reflects the Commonwealth Government's failure to support its own research institutes and laboratories, including CSIRO, ANSTO, and DST, and State Governments failing to maintain support for their agricultural research institutes and laboratories.

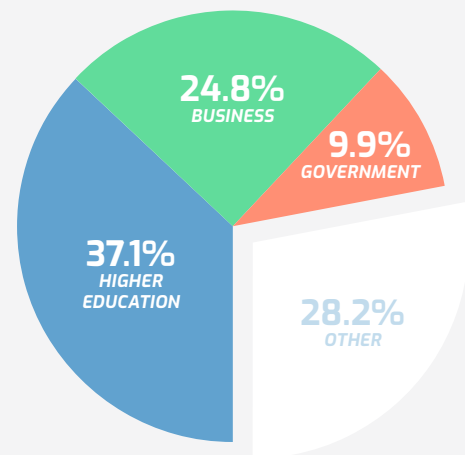
## Australia's R&D mix

Australia's national R&D mix fundamentally differs from our trading partners, where business R&D is a more significant component of the national R&D profile.

In 2019, Australian higher education expenditures on R&D amounted to 37.1% of national research investment (compared to 24.8% in 2008), with business contributing 53.0% (62.8%) and government 9.9% (12.4%).

On these metrics, higher education appears to be doing the 'heavy lifting' in Australia's R&D - priorities are reflected

### AUSTRALIAN R&D BREAKDOWN - 2019



Data: Dr John Howard

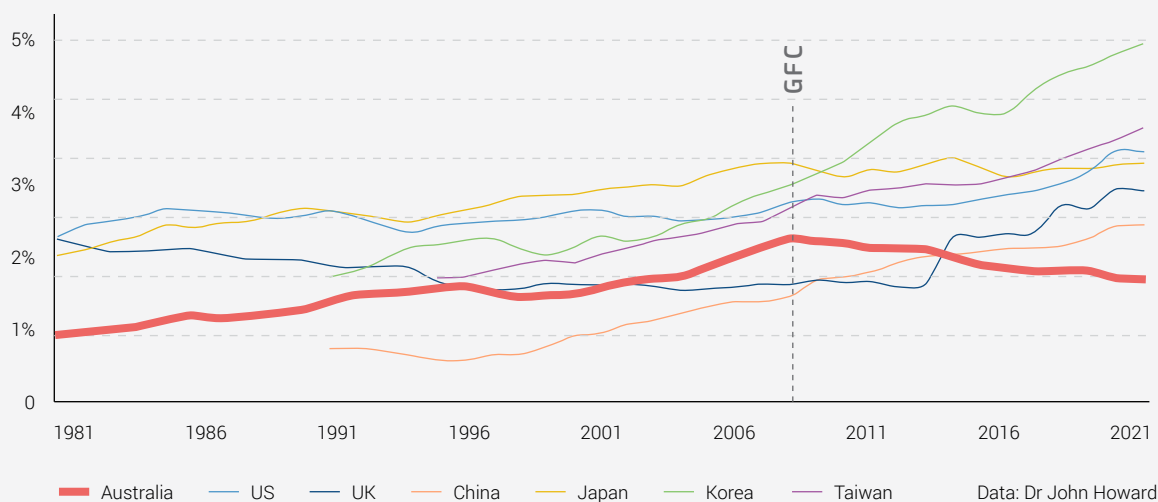
in health and medical research investments, with 30% of publications in life sciences fields.

This compares with an output of 19.2% in the Natural Sciences (Chemistry, Physics and Earth Sciences), 19.8% in Engineering and Information and Computing Sciences, and 18.5% in the HASS disciplines.

These investments may or may not reflect a national R&D strategy - since we do not have such a strategy, we would not know.

[Click here to explore the full write-up online](#)

### R&D % OF NATIONAL GDP BY COUNTRY



Data: Dr John Howard

# INNOVATION AND INDUSTRY POLICY CAN DRIVE A FUTURE MADE IN AUSTRALIA



**Emeritus Professor Roy Green**  
Special Innovation Advisor, UTS.  
Board member of CSIRO

*Australia has a new opportunity to build new industries through focused, coordinated industry and innovation policy.*

While lacking detail at this stage, the significance of Prime Minister Albanese's Future Made in Australia announcement should not be underestimated.

It is a recognition at the highest levels of government that 'old orthodoxies' have failed to shift the dial on stalled productivity, wage stagnation and energy transition.

The proposed legislation will not just be a tidy-up but a major change in the way Australia does innovation and industrial policy.

We now have the prospect of a more coordinated approach to the revival and reinvention of our manufacturing capability.

As a share of GDP, Australia's R&D expenditure has declined to 1.68 percent, way behind the OECD average of 2.8 percent, with countries like Korea, Israel and Switzerland reaching 4 and 5 percent.

While the growth of business and government spending on R&D is at a standstill, universities have begun to do much of the heavy lifting, mainly as a result of their access to increasing international

student fee income.

Clearly, this is not a sustainable proposition for the longer term.

## Hollowing out of manufacturing

The poet T S Elliot once observed that 'humankind cannot bear too much reality'.

This is certainly the case when it comes to Australia's ranking in the Harvard Atlas of Economic Complexity. The ranking, which measures the diversity and knowledge intensity of a country's export mix, has continued its downward slide from around 55 in the 1990s to 93 today of 133 countries, just behind Uganda.

Another way of looking at Australia's performance is with a location quotient (LQ) index which identifies the share of advanced industries in the economy devised by the Washington-based Information Technology and Innovation Foundation (ITIF).

If Australia had the same share of advanced industry output as the global economy, its LQ would

be 1.00. Such industries include pharmaceuticals, electrical equipment, machinery and equipment, motor vehicles, other transport equipment, computers and electronics, and information technology and information services.

In 1995, Australia's advanced industries' LQ was 0.56, meaning it had 44 per cent less advanced industry production as a share of its economy than the world.

But by 2018, its LQ had fallen to 0.41, ranking 51 of 74 nations, just ahead of Costa Rica and behind Iceland.

To compare, America's LQ is 0.94, China's 1.34, and Germany's 1.74. Even the UK and Canada, which have also deindustrialised, lead Australia, with 0.80 and 0.60 scores.

If policy-makers want Australia's advanced industry output to be the same share of its economy as the global average, output would have to increase by almost 1.5 times, or \$105 billion.

Gaining share in advanced industries means a larger economy, higher skill jobs and a more resilient and sophisticated industrial base.



The hollowing out of manufacturing has left Australia vulnerable to commodity price cycle and supply chain shocks.

In focusing on our comparative advantage in resources, policy-makers missed the chance to pursue new and existing areas of competitive advantage, based on knowledge and ingenuity.

### **Narrow trade and industrial structure**

Australian living standards surged ahead thanks to a crude but effective strategy of infant industry development behind protective tariffs.

When by the 1980s, the costs of protection were seen to outweigh the benefits, the Hawke-Keating government began of tariff reductions, introducing they introduced industry plans and structural adjustment measures to encourage a shift from vertically integrated mass production to smaller, more specialised firms that could compete in global markets and value chains.

However, instead of building on success in the commodity boom, governments complacently took the windfall gains and allowed the market to take its course.

As a result, the manufacturing share of GDP in Australia is the lowest in the OECD at around 6 percent, with the manufacturing trade deficit doubling in the last two decades to \$180 billion.

### **New approach to industrial policy**

Nevertheless, Australia is uniquely fortunate, once again, in having another chance to get its policy settings right.

The scale of the opportunity is huge – the Future Made in Australia initiative is the first step in a coordinated ‘whole of government’ approach to enabling competitive advantage in a new, higher value adding growth market for Australian firms.

It will require close collaboration by industry with research and education institutions, and a central institutional focus in the design

and implementation of industrial strategy, with national missions identified through technology foresighting and review.

Levers to be pulled as part of this strategy include the newly established National Reconstruction Fund and Industry Growth Program, together with longstanding programmes such as the Industry Capability Network and Cooperative Research Centres.

In addition, there is scope for a more ambitious approach to public procurement, skills upgrading and the development of a network of place-based innovation ecosystems, which would complement conventional research commercialisation pathways.

There is now broad recognition around the world that government must play an active role in building a more inclusive and dynamic knowledge-driven economy - key to addressing these challenges is the need to grow manufacturing capability

[Click here to explore the full write-up online](#)

# OPPORTUNITIES *DRIVING* *INNOVATION*

## SPACE

*Australia has belatedly entered the space race and the race to the Moon and Mars.*



**Xavier Orr**  
CEO and Founder of  
Advanced Navigation



Australia's space sector has skyrocketed in the past two decades.

As of 2008, Australia was the only Organisation for Economic Co-operation and Development (OECD) country other than Iceland to not own a space agency.

Fast forward 16 years, the country not only formed the Australian Space Agency, but also funded a number of projects including the SmartSat Cooperative Research Centre, the Modern Manufacturing Initiative, as well as supporting NASA's Moon to Mars Initiative.

In late 2023, Australia also signed an agreement that would allow US companies to carry out space launch activities in Australian spaceports.

Today, Australia's space sector is experiencing an annual growth of more than seven percent – outpacing GDP – and is expected to triple in size to \$12 billion by 2030.

The figures spell out an extraordinary achievement but to move forward we must focus on two key areas: continuing with R&D efforts in space, and developing a workforce with space-related skills.

## Bolstering space R&D

The importance of high-quality R&D cannot be overstated. It enables the generation and expansion of new knowledge, which can be turned into practical products and solutions for the betterment of society.

A prime example of this is the development and launch of CubeSats in 2021, known as the M2 mission, by UNSW Canberra Space and the RAAF.

The small satellites greatly enhanced Australia's space situational awareness through data captured in space, indicating the significant impact that targeted investment in the research sector can have on building space capabilities.

In a more recent case, the Australian Space Agency awarded my company, Advanced Navigation a \$5.2 million Moon to Mars Initiative: Demonstrator Mission Grant, to speed up development of a space-qualified sensor called LUNA (Laser measurement Unit for Navigational Aid).

LUNA, which improves spacecraft's reliability of autonomous landing manoeuvres and navigation on the Moon, is set to be demonstrated on board Intuitive Machines' lunar landers in 2025.

## Moving the dial in Australia's space sector

In a new era of space exploration, unlocking the space economy requires collaborations that can turn empirical scientific knowledge into real-world solutions.

In March, Space Machines Company successfully launched Australia's largest-ever private satellite, an Orbital Servicing Vehicle named 'Optimus', to provide life-extension services, inspections and assistance to existing space infrastructure and satellites on-orbit.

Optimus is equipped with Advanced Navigation's Boreas X90 inertial navigation system, allowing it to navigate and manoeuvre within and between Earth orbits with high precision.

To realise new opportunities, Australia must continue building a cohesive and agile space R&D sector to engage in science-to-industry partnerships, as well as develop a domestic workforce with the necessary space-related skills.

A range of economic, technological and social benefits will ensue from this.

[Click here to explore the full write-up online](#)

CONTINUED



DRIVING INNOVATION

## MEDTECH

*Australian R&D is concentrated around human health and medical technologies.*



**Dig Howitt**  
*CEO of Cochlear*

Cochlear has long been a pioneer in innovation. It has reshaped hearing technology and made substantial contributions to the economy and society.

Cochlear is a global company with a proudly Australian heritage and is frequently held up as a successful example of Australian innovation following Professor Graeme Clark inventing the multi-channel cochlear implant.

The commercialisation of the cochlear implant was supported by \$4 million of direct grants from the Federal Government. These grants were milestone based and supported the highest risk phases of commercialisation.

Without these grants Cochlear may have fallen over or seen the offshoring of its intellectual property.

Today, Cochlear has a global



workforce of over 5,000 employees, with over 40 percent based in Australia. And the company contributes over \$700 million annually to the Australian economy.

This demonstrates the benefit of translating research into globally successful products in Australia.

Small, targeted grants or investments at key early stages of commercialisation can be important to get companies started, but these companies only grow and thrive if the core capabilities and policy settings are in place to enable businesses to compete in a global market.

### **A Future Made in Australia**

The Government's proposed Future Made in Australia Act needs to be carefully targeted and accompanied by a policy environment that is internationally competitive and enables business in industries where we do have a comparative advantage to thrive.

Grants and loans aren't enough on their own — the government needs to address longstanding inefficiencies in the tax system.

In addition, an increasingly complex regulatory burden, including in

industrial relations, makes it difficult for Australian manufacturers to be internationally competitive.

Global competition for the commercialisation of medical research is fierce.

Nations vie for the opportunity to capitalise on research mobility, recognising the potential for job creation, local business growth, and tax revenue generation.

Sustained investment and a competitive economic environment are essential for international business competitiveness.

The Tech Council noted in its 2023 paper 'More shots on goal' that the Australian tax system currently provides greater incentives to invest in a forklift than in developing software.

Such misalignments hinder economic objectives and innovation. With so many things going right for medical innovation on the research side, the right policies and incentives from the Government could be the boost that ensures advanced medical manufacturing plays a key role in propelling Australia's growth.

[Click here to explore the full write-up online](#)

DRIVING INNOVATION

## CLIMATE

*Investing in climate change and energy transition R&D could transform Australia.*



**Katherine Woodthorpe**  
*President of the Australian Academy of  
Technological Sciences and Engineering*

In the fight against climate change, Australia and the world are at a crossroads.

The threats of extreme weather, population displacement and vulnerable infrastructure call for an ambitious global push to support decarbonisation.

We need Australia to set ambitious targets for research and development (R&D) to position the nation at the vanguard of global action.

For Australia, the climate challenge is full of opportunities. Our plentiful renewable energy resources, educated population and R&D leadership are the advantage we have to leverage in order to become an innovation nation.

Taking advantage of the opportunity in front of us will require first and foremost an investment in our people. The Government should urgently prioritise upskilling our workforce.

The earlier we can invest in equitable education and our future capability, the better equipped we will be to embrace the post-carbon world.

The recently released Universities Accord review makes clear the enormous potential to come from giving more people from more backgrounds access to high-quality education.

### The economic return from R&D

But we have a solution to hand. We know that every dollar spent on R&D returns \$3.50 to the economy.

Increasing this by around \$2 billion per year for the next decade would bring it closer to our international peers around 3% of GDP.

The injection of discovery, creativity and employment opportunities this would provide can't be ignored.

If we are to decarbonise the economy and deploy renewable technologies at scale, this is how it will happen.

The raw materials of the batteries powering our transport could be refined and made into products here.

We could export our renewable energy embedded in green hydrogen, ammonia or steel.

Meeting a net zero by 2035 target will not be easy, but it is achievable.

With immediate large-scale investment in both skills and infrastructure, and regulatory support at all levels, we can rise to the challenge.

[Click here to explore the full write-up online](#)

# WHY BUSINESS INVESTMENT IN R&D NOSEDIVED

AUSTRALIA RANKS

**93<sup>rd</sup>**

**ON GLOBAL ECONOMIC  
COMPLEXITY INDEX**

Harvard says this places Australia between Uganda and Pakistan

AUSTRALIA HAS

**36**

**RANKED BUSINESSES IN  
FORBES GLOBAL 2000**

A dismal representation for Australian industries

AUSTRALIAN COMPANIES &  
INDUSTRIES ARE SKEWED TO  
LOW R&D SECTORS

**50%**

**LOWER R&D**

Finance  
Retail

**40%**

**MODERATE R&D**

Resources  
Other



**10%**

**HIGH R&D**

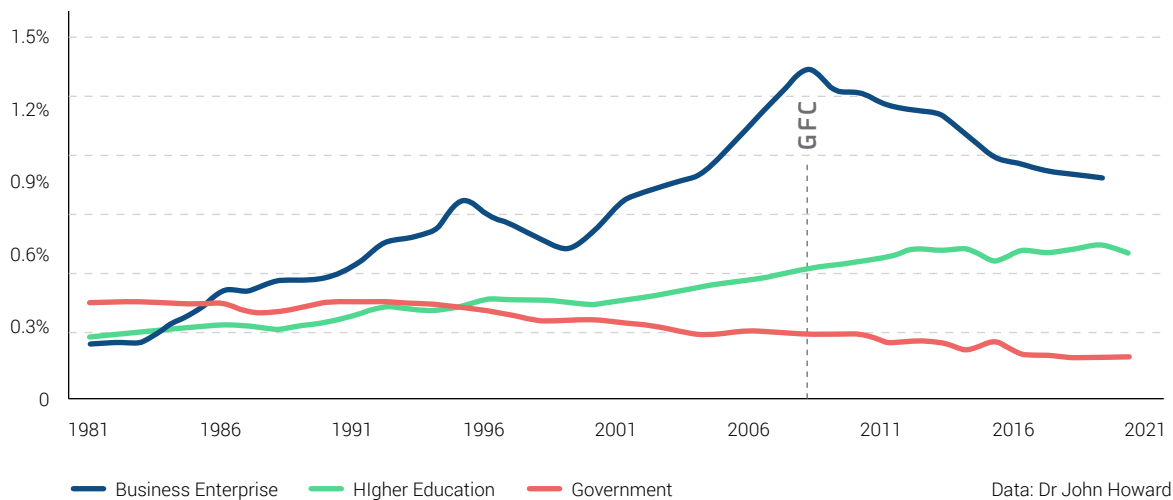
Technology  
Medical  
Manufacturing



**Dr John Howard**

Executive Director, Acton Institute  
for Policy Research Innovation and  
Visiting Professor at UTS Institute  
for Public Policy and Governance

Data: Dr John Howard

**R&D % OF AUSTRALIAN GDP BY SECTOR**

### *Faltering business expenditure on R&D is a major factor in Australia's poor innovation performance.*

From 1981 to 1995, Australian businesses made steady progress in lifting the proportion of R&D performed by the sector as a percentage of GDP.

When the across-the-board tariff cuts announced in 1988 came into effect, the proportion dropped and then recovered progressively, reaching the equivalent of 1.37% of GDP in 2007

### **An unsupportive and unstable business investment climate**

Between 2008 and 2022 Australia has largely had governments disinterested in R&D and there were 14 mostly junior Ministers with responsibility for industry, science.

The period was characterised by a plethora of new initiatives which were underfunded, short-lived, and public service 'efficiency dividends' killed off policy capability and promoted transactional government-business relationships.

### **The globalisation of corporate R&D**

Multinational companies decide where and how to source R&D capability based on identifying challenges, and coordinating resources to meet them.

Australia is uncompetitive in attracting global R&D and has no Foreign Direct Investment (FDI) policy to attract R&D investment.

### **Privatisations, mergers, and acquisitions**

The privatisation of energy corporations impacted significantly on R&D investment.

Australian Defence Industries

was privatised in 1999, passing to foreign ownership.

### **Investor pressure for shareholder value**

Publicly listed companies are under pressure to maximise shareholder value, compromising investment in R&D.

Capturing shareholder value through acquisitions is a driving force - R&D is cut back or eliminated entirely.

Australian Boards have been rewarded for, increasing shareholder value, diverting profits to share buy-backs rather than global growth through R&D.

### **Conclusion**

Reversing the slide in Australia's R&D will involve addressing these underlying causes.

[Click here to explore the full write-up online](#)

# TAX INCENTIVE *IS ALIVE & KICKING*



**Kris Gale**

*Chairman of Michael  
Johnson Associates,  
Founding Member of RDTI  
National Reference Group &  
RDTI Roundtable.*

***As the main support mechanism  
available for innovation, the R&D  
Tax Incentive remains a vital tool  
for Australian companies***

In Minister Husic's 3% R&D drive to survive, one constant refrain in the Government's innovation support story is the need to make full use of the R&D Tax Incentive (RDTI).

Yet how often have you heard the following statement in recent years – "I don't claim the RDTI. The Federal Government is cracking down on taxpayers and it's just not worth the risk."

With 13,000 companies currently claiming the RDTI, it's surprising that this sentiment still exists but it remains a belief many see as well founded.

There is still a concerted hangover from the last decade where the dual agency of the ATO and AusIndustry gave rise to legitimate and widespread concerns that the Government was trying to so restrict the eligibility criteria of the RDTI. At times the programme was seen to be heading to irrelevance.

Added to that, there was pending legislation to dramatically reduce the value of the RDTI, particularly for larger organisations. Periodic releases published by the Government were more likely to be labelled as 'alerts' than 'promotions'.

Despite that environment, even then the programme remained worth claiming, provided you understood what the legislation was actually designed to support and you kept contemporaneous records of what you did and what you spent.

Well, if the case to make claims was more than arguable last decade, a series of fortunate events since that time has made the business of accessing the RDTI a far more secure and valuable one in the middle of this one.

So much so that eligible companies developing new and improved products really have no excuse to not be making annual RDTI claims.

Those key events may be summarised as follows:

- The administrative 'crackdown' on taxpayers that took place between 2015 to 2019 came to an end due to a combination of the courts confirming the breadth of the definition of eligible R&D activities, an influential Small Business and Family Enterprise Ombudsman's report and persuasive public debate.
- The Coalition dropped its RDTI cuts in the October 2020 Budget, acknowledging the critical role played by science and innovation in the early days of the pandemic and in enabling Australia to meet a Net Zero 2050 emission target.
- In July 2021, the Coalition relaunched a more valuable RDTI which has improved the innovation support framework.
- And the return of the Labor Government that has seen the RDTI maintained in its present form as it looks towards the delivery of its big innovation support reform, the \$15 billion National Reconstruction Fund, later this year.

Underpinning the positive matters described above is the fact that the definitions of eligible R&D activities and expenditures remain unchanged since the RDTI was introduced in July 2011. This period of stability is without precedent in the field of government support for industry.

Now, of course, I need to leaven the premise that it's all rainbows and unicorns when claiming the RDTI in 2024 by sharing with you some recent occurrences that remind us all to stay fully abreast of what the Government is saying about the programme.

Two Taxpayer Alerts were published by the ATO in late 2023 regarding overseas R&D claims and payments to associates.

Of particular note in these Alerts is the ATO's clear position that companies can only claim R&D expenditures incurred with their associates in the year they are actually paid, unless the R&D entity makes an irrevocable election.

Overall, the Alerts were a reminder to follow the law and was, thankfully, not an indication of any great tightening of the eligibility requirements.

And a very recent AAT case also cast uncertainty about whether both AusIndustry and the ATO can assess the eligibility of a taxpayer's R&D activities. We all need to work to get public reassurance that only AusIndustry has the carriage of this fundamental aspect of the RDTI.

To stay on top of all this, you need good advice. And good advice will inevitably be a key part of ensuring that your business makes appropriate use of the RDTI, a programme that is very much alive and kicking.

*Kris Gale is the longest serving RDTI consultant in Australia, having joined Michael Johnson Associates (MJA) in 1987. He has experienced all dimensions of the programme from day-to-day consulting with companies to helping companies on audit and dealing with government policy makers and appearing before Senate committees as an expert in the field. Kris is a founding member of the Federal Government's RDTI National Reference Group and the RDTI Roundtable, and recently was appointed to the Board Of Taxation's review of the dual agency delivery model for the RDTI.*

[Click here to explore the full write-up online](#)

# EXPLORING

## WAYS FOR INNOVATION



Jefferson Harcourt  
Founder of  
Grey Innovation

## SBIR MODEL

*One innovation model that works in the United States could also boost R&D. Here, we explore a proposed Australian Small Business Innovation Research Programme.*

Research and Development (R&D) is essential in driving economic growth and maintaining a competitive advantage, and in Australia there's a pressing need to enhance R&D efforts to be relevant on the global stage.

One effective approach is to draw inspiration from successful models, such as the United States Small Business Innovation Research (SBIR) programme, which has been instrumental in catalysing innovation.

By adopting a similar framework tailored to Australia's unique needs and bolstering government procurement of homegrown innovative technology, the nation can significantly amplify its R&D capabilities.

### The US SBIR Model:

The US SBIR programme, initiated in 1982, has emerged as a beacon of success in fostering innovation among small businesses.

This programme allocates a portion of federal research funds to small businesses, enabling them to conduct R&D with the goal of commercialising innovative technologies.

The programme operates in three phases: feasibility study, R&D, and commercialisation with successful projects receiving funding at each stage, turning innovative ideas into marketable products or services.

Crucially, the end goal of many projects is a government purchase order, allowing participants to raise capital to support the endeavour, rather than a fully funded grant programme.

### Adapting the SBIR Model to Australia

An Australian SBIR initiative could involve allocating a portion of government R&D funds to small and medium enterprises (SMEs) through a phased approach.

By providing financial support and guidance throughout the innovation lifecycle, Australian SMEs would be empowered to pursue high-risk, high-reward R&D projects, driving technological advancement and economic growth.

#### KEY ELEMENTS OF AN AUSTRALIAN SBIR PROGRAMME:

**Funding Allocation:** The Australian government can allocate a percentage of its R&D budget to support SMEs through competitive grants awarded based on the potential for commercialisation and alignment with national research priorities.

**Phased Approach:** An Australian initiative could consist of multiple phases, each providing increasing levels of funding to support R&D activities.

**Emphasis on Commercialisation:** To maximise R&D investments, the Australian programme should prioritise projects with clear pathways to commercialisation, and vendors with a track record of delivery.

**Offer conditional purchase orders:** based on an agreed set of acceptance criteria.

[Click here to explore the full write-up online](#)

CONTINUED ►

WAYS FOR INNOVATION

## ARM HUB, BRISBANE

*To build Australian industry, our R&D investments have to meet Australian industry needs.*



**Professor Cori Stewart**  
Founder and CEO  
ARM Hub

Innovation success in other countries has come from long term investments in R&D commercialisation and translation centres like the Fraunhofer Institutes in Germany, UK's Advanced Manufacturing Catapult Centres, and similar manufacturing capability centres and networks in Sweden, Singapore, Israel and Canada.

These are independent industry-led centres addressing local industry market creation opportunities leverage cutting-edge science and technology.

These Centres are supported by industry, governments and research and training bodies. Universities partner with these Centres to provide research, know-how and new talent.

These are the Centres models I have adapted to build the ARM Hub here in Australia, including our commitment to support small-to-medium enterprises.

While Australian robotics was winning on the world stage in 2020, Australia hit its lowest global ranking for robot population density in industry, ranking 35th out of 37 countries, and a long way from our previous position at 18th when Australia still had a car industry.

Robot density is measured by the number of industrial robots in operation per 10,000 persons employed in each country.

More recently in 2022, Australia rose up the rankings from 35th to 28th, likely an outcome of accelerated automation during COVID as well as initiatives like the ARM Hub that are directly addressing the misalignment between research and industry capability.

The establishment of the ARM Hub in 2020 aimed to accelerate Australian industry's adoption of robotics that was alarming low given the country and Brisbane's global reputation in robotics research.

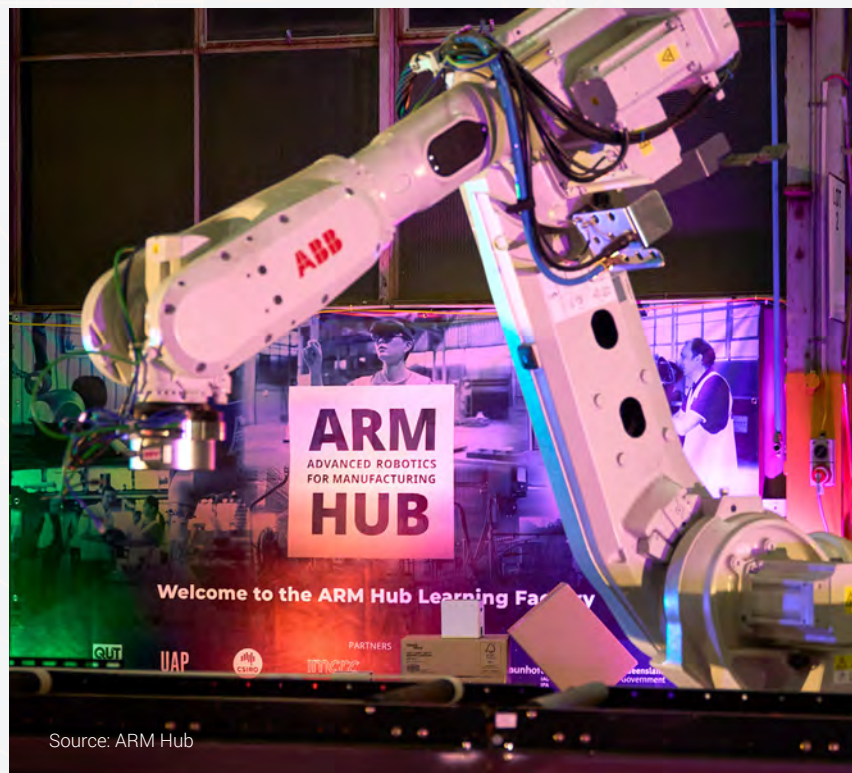
In 2017, the Queensland University of Technology famously won the Global Amazon Challenge, solving the USA company's pick and place technical challenge up against the world's.

Between 2018-2021 CSIRO's Robotics and Autonomous Systems Group, also located in Brisbane, was successfully competing in the elite DARPA SubT Challenge, a global initiative of the United States Department of Defence to map and navigate underground environments.

CSIRO's team came close to winning the Challenge, and as runner up gardened global prestige.

Now that Australia is under immense pressure from sovereign industry investments made by other nations and regions, it is time to spend 3% of GDP on R&D and crowd-in strategic market creation efforts to deliver 'A Future Made in Australia'.

[Click here to explore the full write-up online](#)



Source: ARM Hub



**Dr Tony Peacock**  
Former CEO of the  
Cooperative Research  
Centres Association.

#### WAYS FOR INNOVATION

## BOOSTING COLLABORATION

### *Australia's Cooperative Research Centres scheme is admired internationally.*

If Australia is to turbocharge our R&D to reach 3% of GDP, businesses will have to do most of the heavy lifting.

A key to improving overall R&D outcomes in Australia is better linking our research sector to our businesses.

It's a bit too simple to say that we are great at research and bad at commercialisation, but there is a trend there.

Most new ideas and innovations in Australian business come from competitors and customers – businesses are not waiting for commercial cool stuff from our universities and research labs.

### **Universities working with industry**

For example, UNSW participated in 40 Cooperative Research Centre – Projects since the inception of that programme in 2016.

That is 2.5 CRC-Ps per funding round, whereas the other seven of the Group of Eight Universities averaged 1.5. Second on the list of participating universities in a non-Go8, RMIT University.

What do UNSW and RMIT do differently? From my perspective, they do more regular, more simple engagement with industry.

A CRC-P is a big deal for a company – they must put up serious investment and they must be the applicant (a university can't directly apply).

Building trust takes time and must be consistent.

UNSW and RMIT both go to some lengths to train their researchers on what industry wants and needs. They don't treat businesses as simply another funding source but see them as a pathway to impact.

The German Fraunhofer Institutes are often held up as the best model for industry-research collaboration, and they do a very good job.

But if you go to Germany as I have with then-Chief Scientist Alan Finkel, the Germans will praise the Australian CRCs to a point that is (almost) embarrassing.

The grass is always greener.

### **Australian research organisations**

Australian research organisations are capable of great success stories. We just need more of them.

We need lots of contact points and the ability to start small. There's no doubt our organisations are getting better.

More consistency from governments will help businesses have more confidence to invest. Businesses need to engage and understand what research organisations can and can't do for them.

[Click here to explore the full write-up online](#)

# FOSTERING CHANGE

*Leading voices from diverse sectors are calling for a renewed focus on fostering innovation and competitiveness in Australian industries.*



"Recently announced grant funding has focused on the formation of new industries.

We strongly advocate for a parallel transition programme that supports existing industries, (SME's in particular), to more effectively embrace business model transformation, technology, and operating models that foster a culture of innovation, experimentation, and the ability to pivot based on market insights."

**David Martin**

*Ai Group's Director of Emerging Industries and Innovation*



"If we allow ourselves to be seduced by the fantasy of doing more of what has resulted in our current situation and expecting a better outcome, we will deserve the shellacking the investment will receive."

**Allen Roberts**

*Director StrategyAudit*



"To enhance the 'complexity' of Australian industries, there is a clear imperative to increase onshore processing and manufacturing of Australia's mineral resources, necessitating greater research funding from industry, government, and higher education institutions."

**Dr Matthew Young**

*Advisor to Australian industries and Researchers*

"Small, targeted grants or investments at key early stages of commercialisation can be important to get companies started, but these companies only grow and thrive if the core capabilities and policy settings are in place to enable businesses to compete in a global market.

Critically, we need to reach a consensus, so policy settings span far more than just one political cycle and industry can act with confidence that Governments' will deliver sustained productivity enhancing policy."

**Dig Howitt**

*CEO of Cochlear*



"While many might argue that academic publications and patents are sufficient for knowledge diffusion, in my three decades of collaboration with Australian SMEs, none have shown any interest in publications, they were more interested in the projects I had engaged in and the products that I developed.

Therefore, to enhance knowledge diffusion in our country, it's imperative to document and archive the R&D projects we've undertaken."

### **Elliot Duff**

*Robotics Researcher and  
Research Consultant*



"While novel, 'new-to-the-world', innovation is an important source of economic performance, it relates to only one to two per cent of Australian firms.

The slow accretion of existing knowledge across the economy — diffusion — is often overlooked as a source of productivity. It has the scope to lift the performance of millions of businesses."

### **Productivity Commission**

*Australian Government*



"In Australia, profits on corporate intellectual property are taxed at the relevant corporate income tax rate, which is currently either 30 per cent or 25 per cent (depending on an entity's annual aggregate turnover).

As such, the preferential tax treatment in a lower tax jurisdiction incentivises companies to commercialise Australian-developed intellectual property and technology overseas.

As a result of companies shifting their commercialisation efforts offshore."

### **Daniel Splatt & Michelle Tan**

*BDO*



"Training the innovation workforce starts by engaging students at university. From scholarships, internships and graduate programmes through to immersive university engagements, we focus on creating a talent pipeline not only to transition students into the workforce, but as way to stay connected to cutting edge research and cross pollinate ideas between academic and business focused innovations.

Once in the workplace, we focus on equipping individuals with the skills, mindset, and tools necessary to foster creativity, problem-solving, and entrepreneurial thinking."

### **Michael Edwards**

*Director of Boeing Research and  
Technology for Asia Pacific*

# BUSINESS R&D STRATEGY

*Laying out the bones of a Commonwealth business R&D strategy to reverse the slide in business innovation.*



**Dr John Howard**

*Executive Director, Acton Institute for Policy Research Innovation and Visiting Professor at UTS Institute for Public Policy and Governance*

Australian business investment in R&D collapsed during the Global Financial crisis and has not recovered.

This calls for a strong government policy response and a full-bodied commitment from the business sector.

This paper advocates a National Business Research and Development Strategy and Action Plan with five policy initiatives, embedded in a National Business R&D Action Plan.

## **An integrated strategy of targeted public support for business R&D**

This strategy would cover cross-portfolio government action targeting business investment, a modified R&D Tax Incentive, a Public-Private Partnership (PPP) for infrastructure and facilities, a Research Facilities Access Program and a National Technology and Knowledge Transfer programme.

## **A massive lift in public R&D investment**

Government investment in public research is essential for building business-government collaborations in areas of applied research and experimental development and providing businesses with access to sophisticated R&D equipment.

There is little doubt that Australian public research has been substantially defunded over the last 15 years. This trend must be reversed.

## **An active and coordinated foreign direct investment (FDI) programme**

There is intense competition among countries and regions to attract global business R&D investment and Australia must respond.

An active and coordinated foreign direct investment (FDI) programme is essential involving:

- A policy framework that provides clarity and stability - including guidelines on intellectual property rights, taxation incentives and obligations, regulatory requirements, grants, research funding, and principles for customised support services
- Global R&D target identification - analysis of global R&D investment trends and target sectors and investors
- A compelling value proposition for investing in Australia - including access to talent, infrastructure, research institutions and supportive regulatory frameworks



- and how it would deliver strong investor ROIs
- Direct engagement with target investors, Promoting knowledge exchange
- And knowledge exchange and technology transfer and support for public-private partnerships—to co-fund and co-implement initiatives that support the objectives of the FDI programme.

## Education and skills development for the industries of the future

Investment in education and skills is fundamental to building and sustaining the industries of the future.

Universities and TAFE/VET institutions still face challenges in 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.

A New Industries R&D Skills Development and Talent Retention Program is required to ensure that Australia's industries of the future will have the people with the required knowledge, skills and capabilities they need.

## Business engagement in innovation districts, precincts, and hubs

At the present time, innovation districts do not receive targeted financial support from the Commonwealth Government.

In the US, the Biden administration has commenced an initiative to designate selected communities across the country as Regional Innovation and Technology Hubs (Tech Hubs) to catalyse investment in technologies critical to economic growth, national security, and job creation.

The Australian Government must designate and financially support the development of innovation districts

and hubs to support the development of industries in the future.

## A rigorous approach for adoption and implementation

It almost goes without saying that Australia requires a National Business Research and Development Strategy and Action Plan.

This should be orchestrated by the Prime Minister and the Minister for Industry and Science through the Australian National Science and Technology Council. It should not be outsourced to an independent Review.

[Click here to explore the full write-up online](#)

# HOW TO R&D



**Professor Danny Samson**  
*Professor of Management at  
University of Melbourne*

*Spending a lifetime studying how businesses innovate reveals best practice for companies in picking R&D targets, and managing the innovation process for optimal results.*

## BUILDING INNOVATION CAPABILITY

Companies in Australia have a terrific opportunity to grow through innovation, given our access to global markets and the present government's approach to supporting 'Made in Australia' goods and services.

For small and large companies in any and every sector, increasing research and development expenditure may be a good start but it is not nearly enough, because the missing piece that has often let us down is the creation and implementation of a 'systematic innovation capability' for our businesses.

Such a capability takes the research and development results as an input and connects the organisation's 'new-stream' to its main-stream of operations and marketing.

### What innovation research tells us

My research at Melbourne University has shown that the creation of a systematic innovation capability should itself be a systematic process, involving planning and execution.

There are two 'must have' drivers to enable the innovation capability, namely an innovation strategy and strong leadership of innovation.

The design of the innovation system, even for the smallest of companies, should consider and include the following elements:

- There must be a well-developed innovation process, sometimes called the funnel, whereby the best of early stage ideas can be evaluated, screened for feasibility, developed and monitored. This includes being disciplined and indeed ruthless when needed, in killing off innovation initiatives that are underperforming and reallocating .
- There must be a balance of resource allocation from the R&D effort to the customer focus end of the value chain, or in plain English, we need to balance the 'technology push' factor with 'market pull'.
- A principal source of innovative ideas comes from our very own employees, hence we need mechanisms, incentives and a culture which will stimulate the creation and 'coughing up' of these innovation ideas to seed the funnel referred to above. We should also be scanning the external environment effectively as well for innovation ideas and opportunities.
- Companies that have a successfully systematic innovation capability are not only proficient at measuring and assessing benefits and costs but also take full account of risk at both the individual project level and in aggregate. They recognise that risk usually goes hand in hand with potential returns and balance their portfolio of innovation activities with a blend of incremental innovations and a small number of radical innovations.

### An innovation system that works

These ideas are based on clear evidence of 'what works', and particularly what is needed to sit firmly between an entity's research and development works and its mainstream of commercial business activities.

[Click here to explore the full write-up online](#)

CONTINUED ►

#### HOW TO R&D

## PICKING INNOVATION WINNERS

We all pick winners: so let's do it well!

From governments and big businesses to startup entrepreneurs, and even individual investors, we make choices under uncertainty, and place bets on 'what will work' in the light of uncertainty.

Once an organisation has committed to building its innovation capability and progressing a portfolio of innovation projects and initiatives, it then becomes a case of prioritising, choosing the initiatives to take forward and then project managing them in a firm and disciplined way.

Our research identified that a purely subjective approach to choosing innovation initiatives is far from optimal, and that a systematic and structured approach can be effectively used as a set of tests of new ideas.

We set out here our proposed minimum set of key tests that every new proposed innovation should be evaluated on.

[Click here to explore the full write-up online](#)

## 8 Key Tests for Evaluating New Innovations

An innovation must pass all these tests to be considered valuable

### FUNCTION & VALUE

This element of feasibility questions whether the innovation will fundamentally serve a required need and be fit for the purpose that is intended and whether the value that is delivered is superior to existing.

### MARKET & MARKETING

This element of feasibility is concerned with the appeal to customers and the ability that we have to effectively find a channel of distribution to the marketplace.

### OPERATIONS & SCALE UP

Can the product or service being developed be affectively mass produced?

### MANAGEMENT & KEY PERSONNEL

Do we have or can we recruit the human resources required to scale up and commercialise this innovation?

### FINANCIAL

Will this innovation activity, whether it be a product, service, new process, new technology, or indeed a new business model, provide a financial return on investment.

### IP CONTROL & ACCESS

This requirement is to ensure that we not transgressing on the intellectual property of others.

### STRATEGIC ALIGNMENT

To what extent does the new innovation fit and align with our organisational strategy and its priorities?

### SUSTAINABLE DEVELOPMENT & ESG

Does this new innovation at least meet minimum standards of environmental and social sustainability, and hopefully perform at much higher levels than those minima?

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# PATENT BOX

## FOR INNOVATION REVIVAL



**Dan Splatt**

Director



**Michelle Tan**

Senior Consultant, BDO R&D  
and Government Grants

*Australia's offshoring  
of intellectual property  
for better tax benefits  
underscores the need  
for a local patent box.*

The [World Intellectual Property Organisation's Global Innovation Index](#) has revealed a steady decline in Australia's knowledge, technology, and creative output over recent years despite consistently high input factors.

A key contributor to this is the gap between research, innovation, and commercialisation, with intellectual property often being shifted offshore when it comes to the point of commercialisation.

One of the reasons companies relocate their intellectual property offshore for commercialisation is the more favourable taxation arrangements available overseas.

In Australia, profits on corporate intellectual property are taxed at the relevant corporate income tax rate, which is currently either 30 per cent or 25 per cent (depending on an entity's annual aggregate turnover).

As companies their commercialisation efforts offshore, Australia does not receive the flow-on benefits of creating the related intellectual property, including the creation of new jobs to drive employment and economic growth.

## A potential solution

One way of appropriately incentivising such commercialisation would be the introduction of a patent box regime in Australia.

Such a regime would likely overcome the current problem by providing a concessional tax treatment to profits derived from eligible intellectual property, thereby incentivising companies to retain the intellectual property in Australia as it is commercialised.

A well-constructed patent box regime has the potential to support Australian innovation by bridging the gap between the research and development and commercialisation of intellectual property.

Over 20 jurisdictions (including the United Kingdom, Singapore, China and 13 of 27 European member states) have introduced patent boxes or similar regimes that offer lower tax rates on products where the patent is locally owned.

Following the introduction of such



schemes in these jurisdictions, many Australian medical companies, including ResMed, CSL and Cochlear, have lobbied the Australian Government to follow suit.

The idea of introducing a patent box regime in Australia is not new and was previously considered by the Australian Government on two separate occasions – 2015 and 2021.

The most recent bill in 2021 sought to implement a patent box for new patents in the medical and biotechnology sectors, with a concessional 17 per cent corporate tax rate.

Following a discussion paper and consultation, the bill was introduced to the House of Representatives in February 2022, however, it was never passed.

In our [submission](#) to the Government's consultation on their [2021 discussion paper](#), we argued that any patent box regime introduced in Australia should not be limited to individual sectors if intended to be retained consistently for years to come.

Legislation of a regime would require the introduction of a new bill to Parliament – providing an opportunity to rectify the shortcomings of the previous bill and secure a simple, attractive, and effective patent box regime for Australia.

Global events of recent years, including the pandemic, have highlighted the importance of local commercialisation and the corresponding impact on fostering a broader innovation ecosystem.

A patent box regime applicable across all industries, not just the medical and biotech sectors, is key to retaining and commercialising intellectual property in Australia and ensuring we remain globally competitive.

To ensure the patent box regime is comparable with other jurisdictions, it should also be industry agnostic, like the regimes in Europe, to attract more companies to retain their intellectual property in Australia.

[Click here to explore the full write-up online](#)

# INDUSTRY LEADERS SPEAK OUT



## DECARBONISATION

*One of the biggest issues in decarbonising is in providing high temperature process heat to industry.*

**Mahesh Venkataraman**  
Chief Technology Officer,  
1414 Degrees

The decarbonisation of process heat, which contributes more than 50 percent of the total energy used in industries, is imperative to the energy transition.

The viability of decarbonised alternatives for process heat hinges on three key factors: the temperature at which they can be used, the size of individual plants, and the current cost of accessing energy.

Most process heat needs are continuous, requiring dispatchable or firmed heat, making it of paramount importance for these industries. Furthermore, the

availability of renewable heat alternatives is very temperature-dependent.

Low-temperature processes (i.e. <200°C), can be electrified using heat pumps and Mechanical Vapour Recompression (MVRs). The high Coefficient-of-Performance (COP) for these technologies increases the overall process efficiency and they are already cost-competitive with fossil heat in certain applications. The electrification options for high-temperature heat (i.e. >200°C) are very application specific, involving multiple pathways.



TES technologies such as 1414 Degrees' SiBox can charge during low-price periods while simultaneously supplying on-demand, 24/7 heat, and can significantly lower the input energy costs compared to any other electrification option without storage.

Several TES technology developers are working in the greater than 600°C market and a few provide up to 1000°C or higher temperatures, like 1414 Degrees, Rondo, Antora, and Kraftblock.

Most of these technologies are not fully commercialised yet.

However, though electrification through long-duration TES systems is widely recognised as vital for cost-effective decarbonisation, the end-users are currently not able to access the lower cost of renewable electricity.

The best decarbonisation pathway will be subjective for each factory or plant, and there is no one-size-fits-all solution for industrial decarbonisation.

Several potential solutions for decarbonising process heat exist, including electrification and thermal storage, but significant hurdles remain such as high grid electricity prices, limited access to time-variant tariffs for smaller industrial users, and lack of availability at commercial scales.

Thermal Energy Storage offers a cost-effective solution, but wider adoption hinges on technological advancements, pricing structure reform, and potential government policy intervention.

[Click here to explore the full write-up online](#)

CONTINUED ►



**Serena Ross**  
*CEO of Circuitwise  
Electronics*

INDUSTRY LEADERS SPEAK OUT

## SMALL WINS ADD UP

### *Much innovation in business is made up of small incremental improvements*

Australia's innovation effort can be improved by a greater focus on 'ordinary' innovation. In contrast to deep-tech or R&D-focused innovation, greater benefits can be achieved from the kind of innovation that arises from continual improvement of ordinary business processes, including manufacturing.

At Circuitwise, we live and breathe innovation in the delivery of our core business of contract electronics manufacturing.

In our industry sector, the majority of contract electronics manufacturers think innovation is about purchasing the latest state-of-the-art, high-speed pick-and-place machines for surface mount technology, and associated equipment such as advanced reflow ovens.

While Circuitwise certainly invests in state-of-the-art equipment, our innovation focus takes a different approach.

Four years ago, we undertook a cultural change programme that empowered the leadership team to drive change in their areas of responsibility, around customer relations, operations, procurement and supply chain for example.

A good example of innovation by continual improvement is our inward goods inspection process, which employed two

people four years ago and still does today. However, over that time we have been able to triple throughput due to an innovation we call Vision Box, that automates the verification process.

Vision Box scans the delivery docket for an item and software extracts all the necessary information our inventory management system requires. The system then checks the information against what was expected and if there is any discrepancy, the engineering team has to check the product to ensure the item is exactly what was ordered.

This change relieves the need for manual inspection and verification, which is vulnerable to error and labour intensive.

Another example is a custom component storage system, with mobile shelving units featuring adjustable individual component bays which light up to guide the operator to the location of the component.

This storage system allows rapid 'kitting' whereby an operator typically locates dozens of components required for a manufacturing run - this innovation reduced kitting times from approximately eight hours to about 30 minutes.

These are the sort of large and small innovations that can increase productivity.

[Click here to explore the full write-up online](#)





**Michael Edwards**  
*Director of Boeing Research and  
Technology for Asia Pacific*

INDUSTRY LEADERS SPEAK OUT

## UPSKILLING

### *Training the innovation workforce is critical*

At Boeing Research & Technology—Australia, the research and development (R&D) division of The Boeing Company, we are focused on developing cutting-edge technologies and solutions in areas including autonomy, new composites material systems and advanced robotics for commercial and defence applications including the MQ-28 Ghost Bat unmanned aircraft system

We know we are more successful when we collaborate, and in Australia we partner across the innovation ecosystem to drive technological advancements in aerospace.

Through extensive research and testing in world class local facilities, BR&T-A pushes the boundaries of aerospace innovation.

#### **TRAINING THE INNOVATION WORKFORCE**

Training the innovation workforce starts by engaging students at university.

From scholarships, internships and graduate programmes through to immersive university engagements, we focus on creating a talent pipeline to transition students into the workforce, and to stay connected to cutting edge research and ideas.

Once in the workplace, we focus on equipping individuals with the skills, mindset, and tools necessary to foster creativity, problem-solving, and

entrepreneurial thinking.

By fostering a culture that encourages and supports innovation, organisations can harness the collective creativity and problem-solving abilities of their workforce, generating new ideas, improving processes, and delivering value to customers.

To cultivate an innovative workforce, organisations can promote open communication, embrace risk-taking, and recognise breakthrough ideas.

Specialist training programmes can be implemented to enhance project management skills, encourage cross-functional collaboration, and foster diverse perspectives and interdisciplinary teamwork.

#### **MEASURING AND TRACKING PROGRESS**

In the realm of R&D, where progress can sometimes feel intangible or incremental, measuring and tracking progress is vital.

Companies can establish metrics to measure and track innovation progress, helping identify areas for improvement and providing feedback for continuous growth.

The focus must be on ultimately delivering our technology into the product and services the company offers.

[Click here to explore the full write-up online](#)



**Geoff Bell**  
*CEO and co-founder  
of MicroBioGen*



#### INDUSTRY LEADERS SPEAK OUT

## AVIATION FUELS

### *Producing sustainable aviation fuels is a big challenge for industry.*

Australia, with its extensive demand for air travel and rich natural resources like biomass, solar and wind, is well-placed to develop a sustainable aviation fuel (SAF) industry.

With proper investment in R&D, Australia is poised to lead globally in SAF production. However, two of the main barriers to Australia becoming a powerhouse for SAF production are food insecurity and the impact on our environment.

Specifically, the challenge lies in identifying the best feedstocks to create jet fuel that is both eco-friendly and economically viable.

Players actively making progress in establishing Australia's renewable fuels industry include:

- Bioenergy Australia and energy majors such as BP Australia advocate for mandates, policy support and creating public awareness
- The Australian Renewable Energy Agency (ARENA), together with Qantas and CSIRO

have created a SAF Roadmap to chart a path for ethanol-to-jet (ETJ) fuel use

- Jet Zero and LanzaJet, with support from Qantas, Airbus, and the Queensland Government, are building an ethanol-to-jet facility
- CSIRO, Sugar Research Australia and the University of Queensland joined an international research consortium for the sequencing of the sugarcane genome.
- And agricultural chemical company Nufarm is seeking approvals to grow the energy crop Carinata.

At MicroBioGen, the Australian biotech company I lead, we have developed a non-GM yeast that can convert waste streams into high-quality single-cell protein. Our 'yeast technology as a service' makes the production of ethanol more efficient, cheaper and sustainable.

This waste to protein technology could accelerate Australia's large-scale production of SAF.

Developing SAF is essential for diminishing aviation's environmental footprint and fostering economic and social growth, aligning with Australia's aim for jet zero.

[Click here to explore the full write-up online](#)



# HIGHER EDUCATION R&D IN BIGGEST EVER DECLINE

*Newly released Australian Bureau of Statistics (ABS) data on Higher Education Expenditure on R&D reinforces concerns about the scope and direction of Australia's R&D effort.*

While the total higher education spend increased in monetary terms between 2020 and 2022, it fell as a share of GDP from 0.61 percent to 0.55 percent.

This represents the biggest decline in the higher education component of R&D expenditure since the ABS started collecting this data.

Up to now, with R&D spending by business and government stalled, higher education was doing much of the heavy lifting, thanks largely to growing international student revenues.

As a result gross expenditure on R&D in Australia has fallen from 2.2% of GDP a decade ago to 1.68 percent now – well below the OECD average of 2.8 percent, not to mention leading countries like Korea, Israel and Switzerland with expenditures of up to five percent.

To reach the Australian government target of 3 percent R&D in GDP could be achieved by 2035 with an additional R&D spend by business and government of around \$4.4 billion a year.

[Click here to explore the full write-up online](#)



**Emeritus Professor Roy Green**  
*Special Innovation Advisor, UTS.  
Board member of CSIRO*

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ENGINEERING

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Industry Capability  
Network

ARENA

Australian Renewable  
Energy Agency

CHIEF SCIENTIST

AUSTRALIAN  
SPACE AGENCY

MEDICAL  
RESEARCH  
FUTURE  
FUND

ANSTO

ARC

Australian Research  
Council

DSIR

*Australia has no overall national industry nor innovation plan, and no method for meaningful co-ordination within the federal government, let alone between Canberra and the states.*

At its heart the Australian government has 16 Ministries sponsoring R&D, 14 of which deliver research programmes.

Within this maze of Australia are statutory authorities, government business enterprises, boards, commissions, research investment councils, publicly funded research agencies, medical research institutes, programme delivery agencies, a National Science and Technology Council with no business members, learned academies and science representative bodies – the Ministry of Industry, Science and Resources alone has 10 boards and 21 other structures guiding R&D



# WHAT IS OUR *GOVERNMENT* DOING?



**Pat Conroy**  
Minister for  
Defence Industry

## DEFENCE

### *The federal government has acted to redesign the defence innovation system, better linking innovation to ultimate procurement*

A strong and sovereign innovation, science and technology sector is critical to Australia's national security.

The Albanese Government is delivering the strategy, investment and the commitment to ensure Australia's defence innovation ecosystem can deliver the advanced technologies the Australian Defence Force needs.

The new Defence Industry Development Strategy details how the Government will grow our sovereign defence industrial base and deliver a greater partnership between Defence and industry. This is supported by \$183.8 million in defence industry grants.

The Strategy feeds into our broader future made in Australia plan which brings together all our work and drive a practical strategy for Australia to seize the opportunity.

The Strategy sets out the priorities for Defence through the new Sovereign Defence Industrial Priorities (SDIPs), providing the detail, certainty and timelines that Australian industry needs to invest.

#### **BREAKING FROM THE WAYS OF THE PAST**

To encourage innovation the government established the Advanced Strategic Capabilities Accelerator (ASCA) with \$3.4 billion over the next decade and a mandate to use a new, fast and flexible approach to innovation and procurement.

ASCA has an Innovation Incubation program specifically designed to nurture industry and academia to identify innovations that can be rapidly adapted, tested and acquired to address capability priorities.

ASCA's inaugural challenge – the Sovereign UAS Challenge – aims to

bolster industry capacity to deliver large numbers of affordable uncrewed aerial systems, or drones.

#### **INNOVATION AND AUKUS**

Australia is working closely with the United States and United Kingdom through our AUKUS Pillar II Advanced Capabilities partnership.

All three nations are committed to taking combining our collective strengths and deepening collaboration to deliver game-changing capabilities at pace.

We are aligning export and trade regulations to drive deeper defence trade between us, enabling most defence items to transfer or re-transfer between our three countries without needing further authorisation.

The ASCA has launched the inaugural AUKUS Pillar II Innovation Challenge, on electronic warfare, seeking to identify opportunities to harness commercial technologies from all three nations.

Electronic warfare will be critical to future operations, and we are working together to achieve electromagnetic spectrum superiority.

The Government's positive plan to grow Australia's defence industrial base is working.

There is more work to be done, because Defence industry – and especially, defence innovation – is an essential partner in keeping Australians safe at home and secure in the world.

[Click here to explore the full write-up online](#)

CONTINUED



WHAT IS OUR GOVERNMENT DOING?

## INDUSTRY AND SCIENCE

*The government has a multi pronged approach to boosting innovation – as explained in the Budget Statement from the Minister for Industry and Science, Ed Husic.*

The Albanese Labor Government understands industry and science are the cornerstones of a strong economy that will enable Australia to be a country that makes more things here.

Our \$22.7 billion Future Made in Australia package recognises immense opportunities for Australia and its people lie at the intersection of industry, energy, resources and skills.

### POWERING AUSTRALIAN MANUFACTURERS TOWARD NET ZERO

The Albanese Government is committed to supporting Australian manufacturers to capture the immense, once-in-a-generation opportunities to capitalise on our competitive advantages and create more secure jobs:

- Investing more than \$500 million to establish the Battery Breakthrough Initiative to grow Australia's battery manufacturing capabilities. This investment will see Australian industry secure more value from our natural resources, diversify global battery supply chains and support the global transition to net zero. This will complement the Government's significant investment in critical minerals through a new production tax credit and additional exploration of highly prospective regions.
- Investing \$1 billion in the Solar Sunshot program to supercharge Australia's ambition to become a renewable energy superpower.



- Developing a pathway to support green metals manufacturing, by undertaking consultation to position Australia as a world-leader in green steel, aluminium, alumina and processed iron. This consultation will complement the \$1.7 billion Future Made in Australia Innovation Fund, which will unlock private capital across new industries including green metals and batteries.

### **STRATEGIC EXAMINATION OF AUSTRALIAN RESEARCH AND DEVELOPMENT**

Greater investment in research and development (R&D) by businesses in Australia is fundamental to maximising the impact of science, research and innovation on Australia's long-term prosperity, security and wellbeing.

The Government will commission a strategic examination of Australia's R&D system to determine how we can get more value from every taxpayer dollar invested in research,

maximise the contribution of science and R&D to the broader economy, and maintain our competitive edge.

#### **Meet growing demand for STEM workers**

To support the development of a thriving, skilled and diverse STEM workforce to build a Future Made in Australia, the Government will invest \$38.2 million in its response to the Pathway to Diversity in STEM Review.

This investment will scale up the Government's Women in STEM programmes and science engagement programmes that are driving positive change to attract and retain more people from diverse backgrounds in STEM education and careers.

The measures in the 2024-25 Budget build on Government investments that will shape and strengthen Australia's future, including the \$15 billion National Reconstruction Fund Corporation and the \$392 million Industry Growth Program.





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