Shots on Goal

A strategy for global success in tech

Shots on Goal
July 2022

About the Tech Council of Australia

The Tech Council of Australia is the peak industry body for Australia's tech sector. Providing a trusted voice for Australia's technology industry, with over 160 members, the Tech Council comprises the full spectrum of tech companies.

We aim to advise and engage with Australian governments, businesses, and the wider community to help support the ongoing creation, development, and adoption of technology across industries.
Our vision is for a prosperous Australia that thrives by harnessing the power of technology.

Authorship

We would like to thank the Tech Council members and experts interviewed as part of this project for their expertise and time. In particular, we would like to thank David McKeague for providing the guiding concept of this report: getting more shots on goal.

Contents

Foreword

Whether it's sports, arts, industry or any number of other sectors, Aussies typically are among the world's best. We're a competitive bunch; we strive to be the best we can. We have a great "can do" attitude and we are not afraid to challenge the status quo.

Over the last 20 years, we have created 100 Australian tech companies worth over $100m. More than twenty have gone on to become unicorns. They include great companies like Atlassian, Canva, Afterpay, WiseTech Global, Seek, REA, Airwallex, SafetyCulture, Go1, Culture Amp and Employment Hero.

What is so exciting about these companies are the common traits they possess. These are businesses who have dreamed big from the beginning, sought to solve complex problems, have challenged the status quo, taken risks, failed, succeeded, grown, and prospered.

That success may not be as visible as someone standing on a dais raising a trophy. But the thousands of jobs, and billions of dollars of value and exports these companies are creating, are generating very real benefits for Australians.

However, despite the success we've experienced in growing globally successful tech companies, challenges remain.

The good news is that Australia is starting to address some of these challenges. The report we're releasing today shows that Australian startups founded between 2013-15 have seen very similar survival rates in the early stages of growth when compared to their counterparts in countries we would consider our primary competitors. This success is the product of many factors: great Aussie talent matched with hardworking migrants, a rapidly growing venture capital industry, and world-class cloud infrastructure underpinning success in software.

The bad news is that the path of many Australian startups and their international counterparts has historically diverged across the later growth stages. Australia-based startups appear to face significant challenges in scaling compared to start-ups in our competitor countries.

There are several reasons that Australian start-ups may have differed from their international counterparts at the scaling stage. This report looks further into the issue of Australia's competitiveness as a place to start and scale tech companies by exploring the availability of required inputs to growth – capital, talent, infrastructure, and regulation.

To address the gaps we identify, this report also puts forward a framework with the essential components that tech policy should include. This framework further includes the range of policy levers available to governments and identifies how Federal, as well as State and Territory governments, can improve their use of available policy levers.

Australia has proven it can create and attract world-class tech companies. But we can't be satisfied with just showing up globally.

Our national mission for the next decade needs to be to become one of the best places in the world to start and scale a company and to create even more 'shots on goal' companies that can scale and take on the world.

This goal is achievable by taking a proactive approach and ensuring that government policies and regulatory settings are focused on encouraging Australian companies to take risks.

Achieving this mission will deliver significant benefits to Australia in the form of new, well-paid jobs, higher productivity, new and sustainable sources of growth, and a better standard of living.

Having lived and worked in Australia and around the world, I know the quality of Australian talent and ideas is second to none globally. I also know that the rest of the world is moving to invest in local companies and industries with a speed and scale that is outpacing Australia.

We must back ourselves to go big or risk being left behind in the new global race for jobs and growth.

Robyn Denholm
Chair
Tech Council of
Australia

Executive summary

Over the last 20 years, Australia has built a strong tech ecosystem that has enabled more startups to flourish. Critically, Australia's tech ecosystem has demonstrated the ability to scale global tech companies having produced 28 unicorns.

Despite this success, Australia has a mixed track record inscaling a tech companies relative to competitor countries, such as Israel and the United States. The good news is that Australia is becoming a more competitive place to start a tech company. In Exhibit I, we see that Australian startups founded in 2013-15 survived through to Series B at a similar rate to startups founded in the United States.

The bad news is that Australia is a challenging place to scale. From Series B onwards the experience of Australia-based startups diverges from the United States significantly. This means Australia can get our players onto the field and a small share are scoring goals, but not enough players are supported to take serious shots.

Fixing our scaleup challenges is vital because these firms produce substantial economic benefits, including a significant number of jobs.

Scaleups typically account for 5% of small and medium enterprises (SMEs), but employ 50% of the people working in SMEs, according to research conducted by the OECD[1].

This means that fixing our scaleup challenges will create thousands of jobs in highly productive, young firms. If Australia's matched the United States' success rate through the scaleup phase (illustrated in Exhibit I), there could have been up to 30,000 additional tech jobs in Australian scaleups today.

Lifting our game

Access to sufficient funding is a significant challenge for Australian scaleups. Lower levels of scaleup funding reflect the youth of Australia's tech sector and shallower capital markets relative to countries like the United States. Through policy changes, we believe that governments can directly and indirectly support the growth of scaleup funding.

Growing the available scaleup funding is critical to ensuring Australia can be a competitive place to scale a tech company. Without action, we will face a $53b scaleup funding gap by 2030. Fixing this funding gap means that Australia would have the same amount of scaleup funding as the United States on a per capita basis making us a competitive place to scale a tech company.

EXHIBIT 1: Survival function for tech firms
Probability of achieving next funding round given previous one has been achieved for firms started in 2013-15
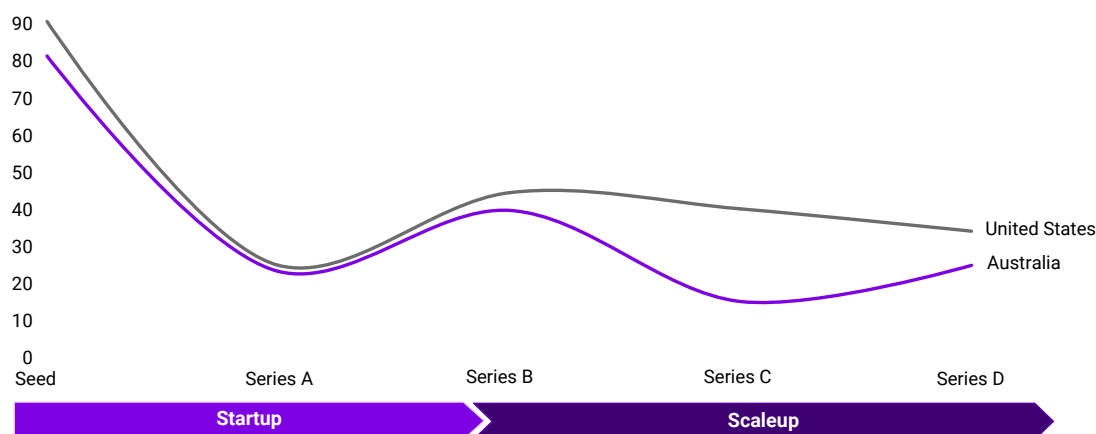
Source: Crunchbase, TCA analysis

1. Source: OECD

Governments around Australia are already taking steps to address this gap. Examples include the establishment of Breakthrough Victoria and the National Reconstruction Fund (NRF). While we welcome these efforts we need to ensure complementary policy processes enable these funds or programs to attract sufficient co-investment. The NRF, for example, has the potential to attract $2.7 for every government dollar invested in tech, which would be inject a total $7bn into Australia's critical tech sector by 2030. However, for the private sector to meet this co-investment potential we will need a 19% increase in specialised foreign investment, and also an uplift in investment from private sources, such as venture funds and superannuation.

The NRF, will provide a much-needed boost in scaleup funding for the priority areas of the economy it covers which reflect many of Australia's strengths in tech[2]. There will also be a need for capital for scaleups outside the NRF's priority areas, such as business software and fintech, which are also sources of comparative advantage for Australia.

Maintaining a strong pipeline of startups

While addressing scaleup funding, we also need to maintain a strong pipeline of startups. At the startup stage, access to funding has improved markedly over the last decade. If we can maintain this momentum, early-stage funding will at least match that in the United States on a per capita basis by 2030. However, this outcome is not assured. With a deteriorating macroeconomic environment and uncertainty over the future of vital grants programs, we risk becoming a less competitive place to start a tech company.

Addressing ongoing talent shortages

Australia continues to struggle from shortages of tech talent which affects both startups and scaleups. Access to technical talent remains an issue for startups. Though shortages of Software Engineers in New South Wales, Victoria and Western Australia appear to be lessening, vacancy rates for Software Engineers in Queensland are still triple the national labour market average.

Access to experienced talent is a significant challenge for scaleups. We estimate that only 1% of Australia's tech workers have scaleup experience, compared to 13% in the United States and 17% in Singapore.

This emphasises that while Australia has great tech talent, we do not always have the right mix of skills and experience. Ensuring Australian startups and scaleups have access to the right talent who can enable them to compete globally is crucial.

There are promising and important new skills and migration reforms being championed by federal and state governments. It is essential that we prioritise the introduction of a specialist skills pathway with globally competitive visa processing times that is accessible to startups and scaleups. Australia is an attractive destination for skilled migrants, and many tech companies are able to attract highly skilled, in-demand tech workers from around the world. But the speed of visa processing in the Australian skilled migration system can be a handbrake on this important source of experienced talent.

Getting more shots on goal

Creating a strong pipeline of high-potential tech companies is vital to Australia's economic and national security as these companies are a source of jobs, growth and strategic capability.

The strength of Australia's ecosystem for earlier stage companies has meant we've seen significant growth in the number of startups. Between 2013-15 and 2019-22, there has been a 78% increase in the number of startups founded. If our ecosystem could enable the same survival rates across the scaleup stage as the United States, this cohort of startups could create up to 140,000 tech jobs by 2030.

To create a stronger tech ecosystem for startups and scaleups, we put forward a policy framework that enables us to identify the priority policy changes required. These changes are grouped into six recommendations for the federal government and three for state and territory governments. These recommendations aim to build on work underway and provide clear prioritisation that will enable governments to move quickly.

Competition in tech is only increasing and Australia cannot afford to be complacent about this shift, or we will be left behind. We have shown in the last two decades that we have the raw talent and ideas to produce companies that are competitive on the global stage. Now we need a game plan to create a more level playing field for high-potential Australian startups and scaleups to take our national performance to the next level.

---

2. Tech Council of Australia, Making Australia into a regional tech hub

National policy recommendations

1. Set the strategic direction for Australia's tech sector

This would provide more comprehensive strategic direction for the whole tech sector, building on the national tech jobs target and the strategic direction for emerging tech areas like the National Quantum Strategy.

2. Expand investment into Australia's scaleups

This could be achieved through a range of policy levers, including expanding direct investment programs, tax system changes and establishing specialised, strategic procurement programs for emerging technologies, drawing on lessons learnt from overseas models

3. Enable more Australians to move into tech jobs

It is important that we ensure more Australians have pathways into fast-growing, well-paid tech jobs. To increase the opportunities for Australians to access these jobs, governments should work with industry to fix gaps in education and training products, and create new pathways such as through digital apprenticeships.

4. Ensure policies affecting the global integration of Australia's tech ecosystem are working efficiently and effectively

This includes ensuring the administration of foreign investment reviews and the skilled migration is efficient and effective. This is critical to ensuring Australian firms can compete on a level playing field with their global counterparts.

5. Ensure regulatory frameworks and processes support the growth of the tech sector

This includes a wide range of regulatory areas, from modernised privacy laws to having informed, targeted and proportion regulation of emerging technologies.

6. Regularly measure and review progress towards making Australia the best place to start and scale a tech company.

To ensure we're on track towards the objectives set through the strategic direction component, we need to set measures that will track progress regularly. This could include establishing an annual scorecard for policy areas affecting tech.

State and Territory policy recommendations

1. Support local strengths in tech

Each state and territory in Australia has localised economic specialities, and we are beginning to see this come through in Australia's tech sector. Understanding these local strengths in tech can support State and Territory Governments to invest efficiently.

2. Support greater adoption of technology in the delivery of public services.

State and Territory Governments are responsible for a range of critical public services, many of which could be improved through greater adoption of technology.

3. Regularly measure and review progress towards improving the environment for starting and scaling tech companies

This should include establishing a scorecard to assess the policies and programs which affect the growth of the tech sector.

In Chapter 5, we explain these recommendations in full with more possible measures discussed for implementation.

Australia needs to become the best place to start and scale a tech company

Over the last 20 years, Australia has built a stronger tech ecosystem that has enabled more startups to flourish. This has produced substantial economic benefits as these firms have grown alongside established tech companies. Ensuring Australia's tech ecosystem is a competitive place to start and scale across established and emerging tech fields is crucial to growing these benefits.

Maximising our shots on goal

A 'shot on goal' is an attempt that's intentional and likely to result in a goal – even if it's blocked by the goalie. It's a term primarily used in soccer and hockey but is also relevant to the tech sector. In tech, a shot on goal could be founding a startup, developing a new class of technology, or launching a new product. These are all intentional steps towards realising success in tech.

In sports, it's well-accepted that some shots will result in goals and ultimately, lead to teams winning a match and tournament. Other attempts may come close but not quite hit the mark. Several will be resounding and spectacular failures.

For Australia to take the next step in growing a globally successful tech industry and tech companies, we need to create more 'shots on goals' companies that have a real chance of scaling globally.

The best way for Australia to maximise the share of successful shots on goal companies we cultivate is to create a competitive ecosystem. That means we need an ecosystem that is abundant in the required inputs – talent, capital, regulation, and infrastructure -- and healthy in rewarding the highest potential startups and scaleups. A competitive tech ecosystem can maximise the number of good shots taken, support the great ones to succeed, and create second chances where shots fail.

Policy choices affect the competitiveness of a tech ecosystem. Through policy changes or coordinated investment we can change the availability of inputs like funding and talent for the whole ecosystem.

Increasing the availability of inputs to growth helps more promising startups to get on the field. Policy changes that support the global integration of our tech ecosystem encourage resources to be gravitate towards the best startups that can scale globally.

3.   Source: The Treasury

Australia has already produced many globally successful tech companies

Australia's tech sector is home to many globally successful companies, including a growing number of tech companies that were founded in Australia.

For every per cent of global GDP Australia has 18 unicorns, which are tech companies worth at least $1bn, as shown in Exhibit 2. Many of these companies began in the last 20 years. Of the 100 Australian tech companies with a valuation of $100 million or greater, 67 of them were founded after 2010.

This cohort's success in the last 20 years is the result of multiple factors. Australia combined great talent and smart policy to grow a startup ecosystem. In 2002, the Venture Capital Limited Partnership (VCLP) program was created to provide a regulatory structure for VC investment comparable to other countries like the United States and then adapted again in 2016 to make it globally competitive[3].

The resulting growth in VC funding, which grew 18-fold between 2014 and 2022 Q1 as shown in Exhibit 3, has enabled more startups to grow and thrive.

EXHIBIT 2: Unicorn contribution relative to GDP

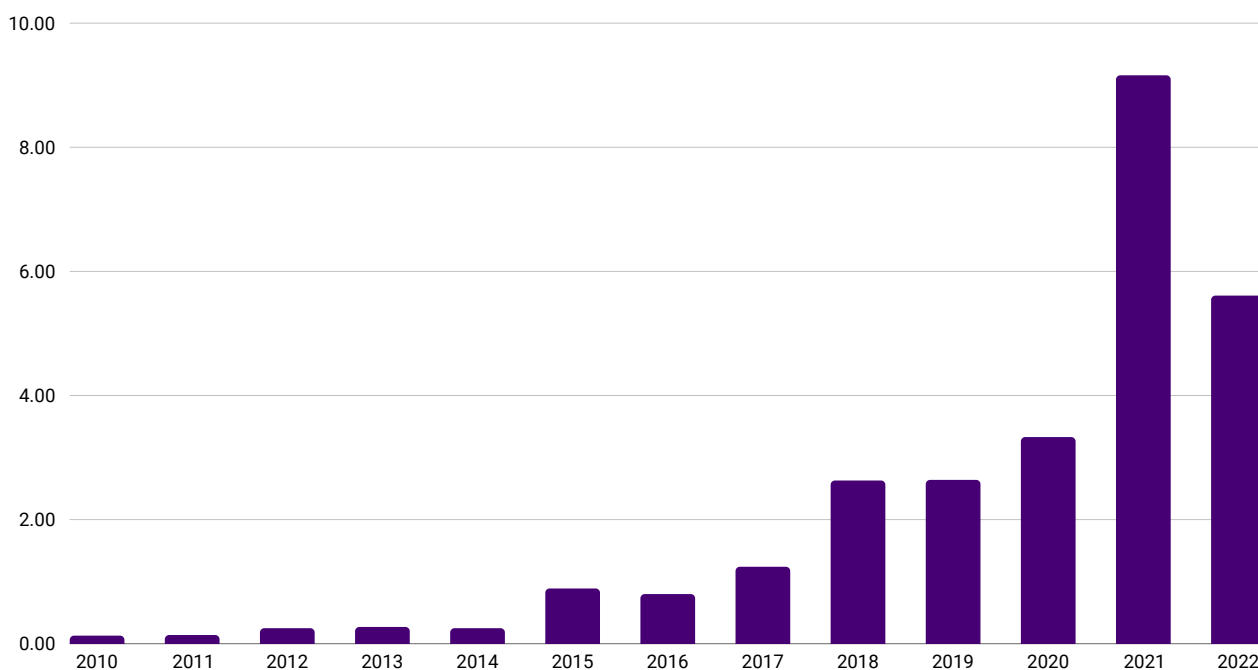Number of unicorns per percent of global GDP, February 2021
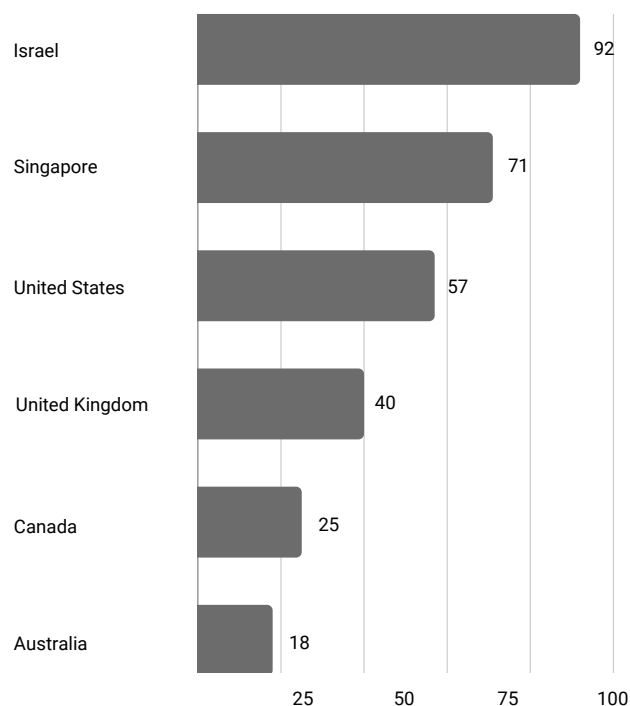
Source: Dealroom

EXHIBIT 3: Venture financing in Australia

Venture capital deals in Australia, total deal value (billions), 2010-2022

Note: Figures exclude add-ons, grants, mergers, secondary stock purchases, and venture debt.
Source: Preqin Pro; Australian Investment Council

---

3. Source: The Treasury

Tech Council of Australia

Shots on Goal

A stronger startup ecosystem has produced substantial returns compared to other asset classes. In the short run, VC and private equity (PE) returns are only slightly higher than other asset classes, shown in Exhibit 4.
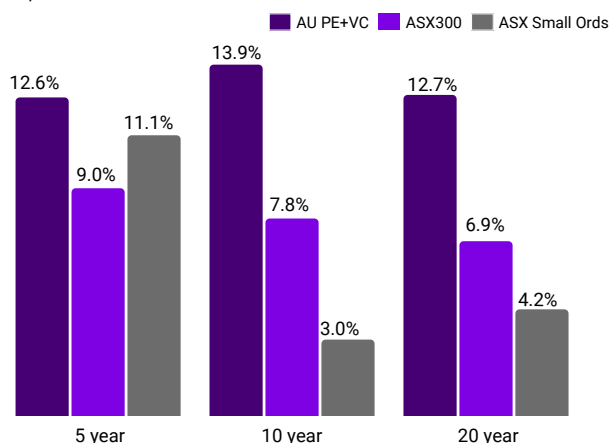
In 2020, Australia VC and PE five-year returns were only 1pp higher than the ASX Small Ords and 3.6pp higher than the ASX300. But over time this difference grows significantly.

The Australian VC and PE 20-year return was 12.7%, almost double that of the ASX300 and triple the ASX Small Ords over the same period.
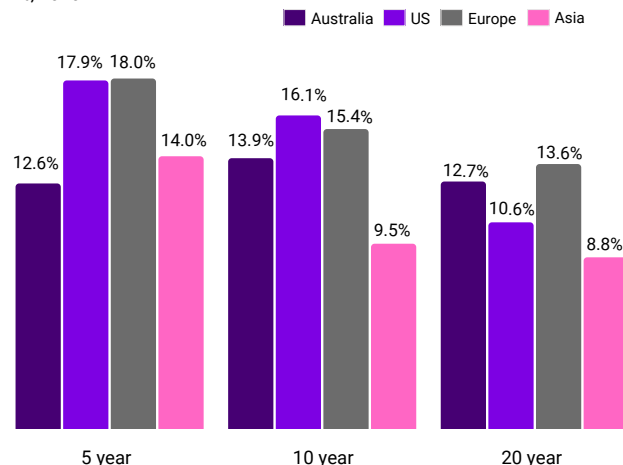
The enduring financial performance of Australia's tech sector also makes it increasingly competitive when compared to other tech sectors. While Australia's five-year returns are slightly lower than competitor markets, our consistent performance means we are just behind Europe by the 20-year mark.

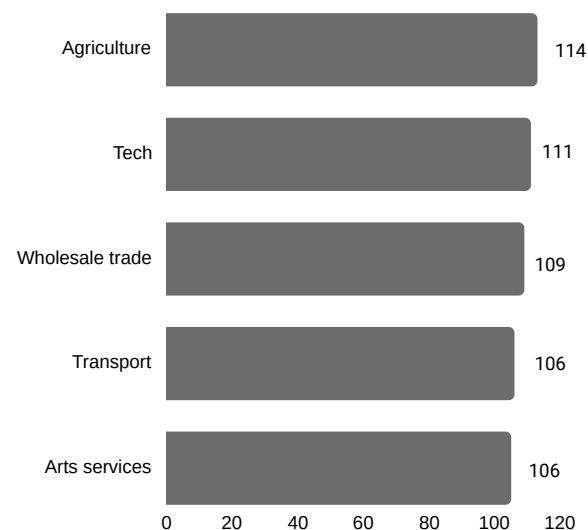**Tech companies are drivers of great jobs, productivity and growth**

Since the early 2000s, Australia has also seen a rapid rise in tech jobs. Over the last 20 years, tech jobs have grown twice as fast as all other tech jobs, as shown in Exhibit 5. While growing rapidly in terms of the number of Australians employed, tech jobs have remained secure and well paid. In 2022, tech jobs were the second best-paid industry only second to CEOs according to SEEK data. This makes the tech sector an increasingly important employer of Australians, providing a significant number of well-paid jobs.

Tech jobs are also some of the most productive in the Australian economy, with the second highest hourly productivity behind jobs in Agriculture, Forestry and Fishing as shown in Exhibit 6. In practice, tech jobs are a significant source of productivity for two reasons. Tech workers are essential to creating new companies, which often develop new technologies or new products that are tech-intensive.

Tech workers across the economy help older businesses keep pace with technological developments and become more productive. Tech workers also play an important role in ensuring that data analysis can make services like healthcare more efficient while maintaining quality, supported by tech infrastructure like hyperscale cloud computing. The productivity and technological value-add inherent to tech jobs makes the companies creating them critical to creating opportunity for Australians now and in the future.

EXHIBIT 4: Returns on Australian PE/VC investments

Australian investment returns by asset class
%, 2020

Legend: AU PE+VC, ASX300, ASX Small Ords

	5 year	10 year	20 year
AU PE+VC	12.6%	13.9%	12.7%
ASX300	9.0%	7.8%	6.9%
ASX Small Ords	11.1%	3.0%	4.2%

Australian and global PE/VC returns
%, 2020

Legend: Australia, US, Europe, Asia

	5 year	10 year	20 year
Australia	12.6%	13.9%	12.7%
US	17.9%	16.1%	10.6%
Europe	18.0%	15.4%	13.6%
Asia	14.0%	9.5%	8.8%

Source: Australian Investment Council

EXHIBIT 6: Top 5 industries by productivity
Gross value added by hour worked, June 2022

Industry	Value
Agriculture	114
Tech	111
Wholesale trade	109
Transport	106
Arts services	106

Source: ABS

Tech Council of Australia

Shots on Goal

EXHIBIT 5: Long term growth in tech occupations

Occupations, indexed at 100 from 1986

Source: ABS

Shots on Goal   Tech Council of Australia
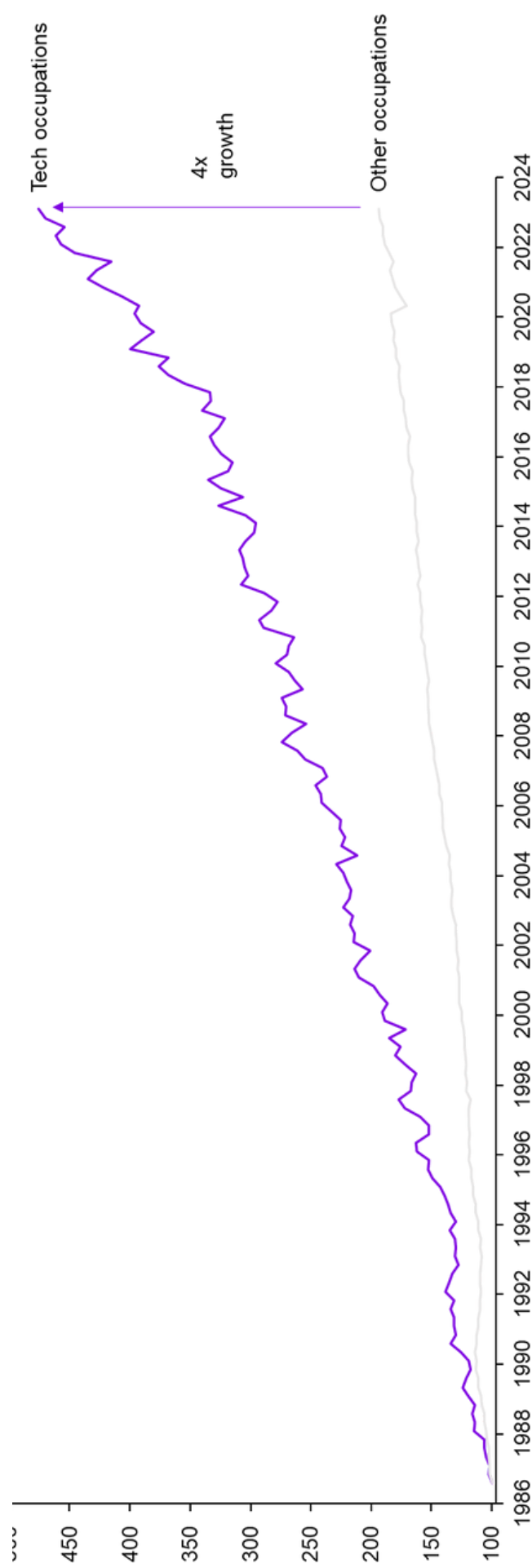
Tech will be critical to tackling Australia's looming economic challenges

Australia's economy charged out of the COVID-19 pandemic on a high of pent-up savings and pandemic-era stimulus. We now face higher, and more persistent inflation, which is driven by a confluence of event-based and structural factors.

The OECD has forecast global growth slowing to 2.6% in 2023, with Russia's war of aggression against Ukraine and the energy crisis derailing the post-pandemic economic recovery[4]. Australia's macroeconomic productivity was already declining before the pandemic, as shown in Exhibit 7. There are now concerns that this downturn could further drive down long-term productivity growth. Without productivity growth, Australians will experience stagnant or declining living standards in the coming decades.

Low productivity also suggests a future in which most Australian companies continue to fall further behind the technological frontier[5]. This makes Australia relatively poorer but also less equipped to tackle whole-of-society challenges presented by climate change and our ageing population. Addressing these challenges will require new technology solutions as part of a broader approach.

Tech workers that develop and guide the adoption of new technologies are essential to Australia's future economic prosperity. The companies that create these jobs – in the tech industry and across the economy – are vital to building a resilient nation.

To become more prosperous and secure in the next 20 years we also need more tech companies. While established companies that started in Australia or came here from overseas will continue to play an important role in the ecosystem, we need to ensure Australia is a great place to start and scale new, innovative companies.

We need to become the best place to start and scale a tech company

While Australia has been successful in growing globally successful tech companies over the last 20 years, we know that it can be a challenging place to scale a tech company relative to competitor countries. If we want to be the best in the world, we need to take a critical look at what we are doing where and identify how to improve the environment for starting and scaling, tech companies.

In the next chapter, we establish the current state of play. This provides a snapshot of Australia's our recent 'game play'. That is, the outcomes for startups founded in Australia compared to those in the United States. This provides a starting point for more in-depth analysis of Australia's competitiveness as a tech ecosystem based on the availability of the required inputs for growth.

EXHIBIT 7: Multifactor productivity

Multifactor productivity, % annual
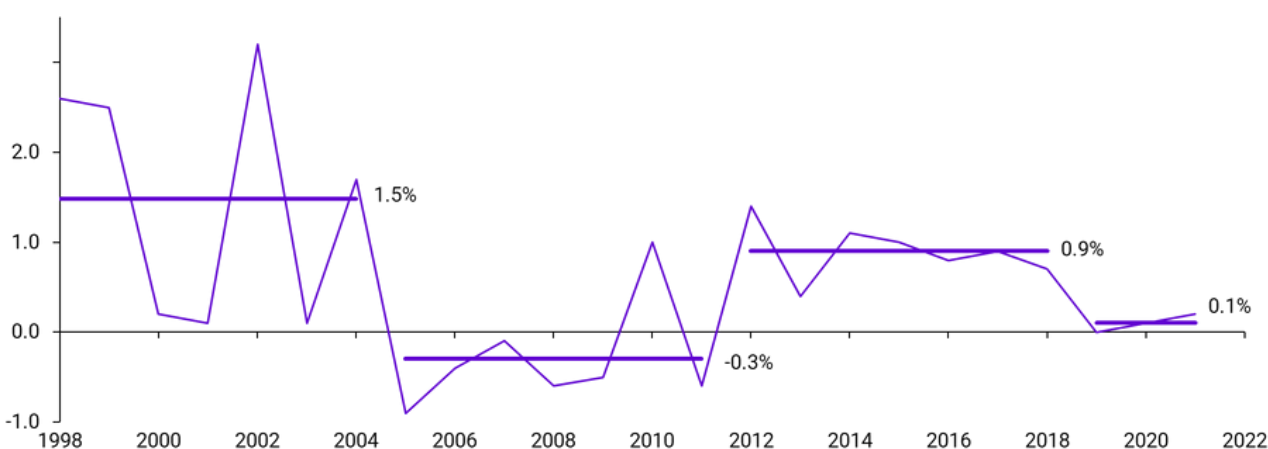
Source: ABS, Treasury

4.   Source: OECD
5.   Source: e61 Institute

The current state of play

This chapter establishes the current state of play for Australia's tech ecosystem benchmarked against the United States in terms of success in starting and scaling tech companies. This shows us that Australia is increasingly competitive as a place to start, but is nowhere near the best place to scale a tech company.

To become the best place to start and scale a tech company, we need to understand how we compare to competitor countries. In this report, we compare Australia with five competitor countries: the United States, UK, Canada, Israel and Singapore. These countries share some fundamental similarities to Australia by being developed economies. These competitor countries also serve as ambitious benchmarks. All have world-leading startup ecosystems[6] and have been successful in growing unicorns[7] which are tech companies with a value of at least $1bn.

While each country has different strengths, we often see the United States leading these rankings and consistently cited as being the most conducive to startups and scaleups' growth. For this reason, we use the United States as our primary comparison because we believe it is currently the best place to start and scale a tech company.

To benchmark Australia against the United States, we have examined the survival of startups founded in each country between 2013-15 using funding data.

We find that Australia is comparable to the United States in the startup phase of growth between founding to Series A, as shown in Exhibit 8. However, during the scaling stage we fall behind. From Series B onwards, the outcomes for Australia-founded startups diverges significantly from their American counterparts. This suggests that while Australia is an increasingly competitive ecosystem for startups, we are nowhere near the best place to scale.

This report uses this finding, illustrated in Exhibit 8, as motivation to examine the competitiveness of Australia as a tech ecosystem. Over the next two chapters, we examine our competitiveness by looking at the availability of inputs to growth – capital, talent, infrastructure, and regulation. Across each of these areas, we explain what tech companies need, how well we're doing and where we can improve.

EXHIBIT 8: Survival function for tech firms

Probability of achieving next funding round given previous one has been achieved for firms started in 2013-15
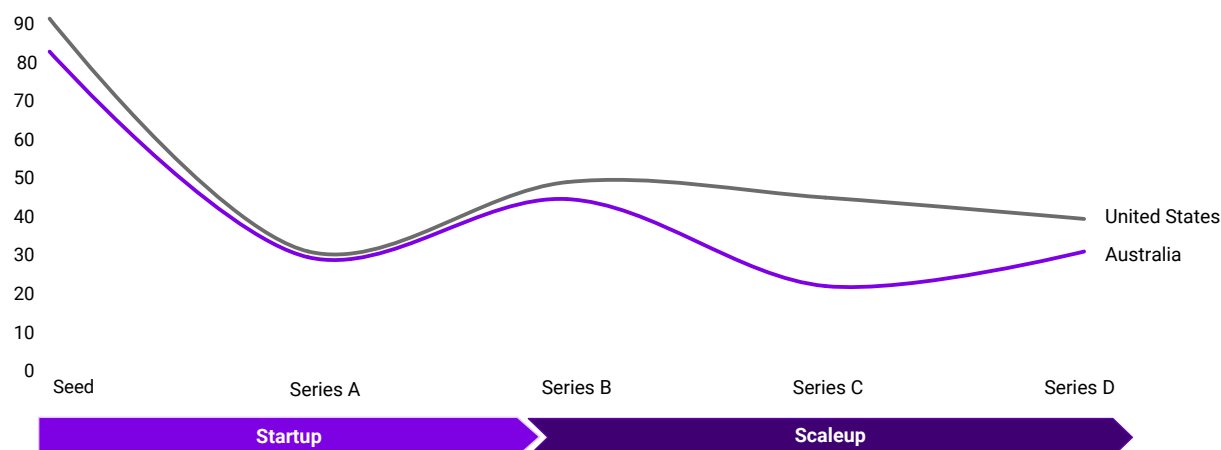
Source: Crunchbase, TCA analysis

6. Source: Startup Genome, 2021
7. Source: Crunchbase

BOX 1: What is a tech company?

What is a tech company?
Tech companies include those that develop technology as their primary business purpose or have technology-driven business models. This means a tech company can be Atlassian or Microsoft, whose primary business purpose is to develop technology products and services, as well The Iconic, whose primary business is being a fashion and lifestyle retailer with a technology-driven model as an e-commerce platform.

All tech companies begin as startups. These are the young, small and innovative companies that seek to develop new technologies or business models that are technology-driven.

Startups are primarily differentiated from established technology companies by their size, but this also acts as a proxy for their maturity. As new businesses developing innovative products or services, startups often have less structure and bureaucracy than more established companies. This enables them to move faster and adapt as they develop their product offering as well as relationships with suppliers, customers, investors, and employees.

As startups scale, they will generally create more structure to support that growth and begin to resemble more established tech companies.

Photo credit: SafetyCulture

Starting

Startups take ideas and turn them into early products that have the potential to scale globally. This chapter examines the ecosystem for startups in Australia by assessing the ability of key inputs to their growth: funding, talent, and infrastructure. We also discuss the importance of regulatory frameworks that support startups growth and the overall health of tech ecosystems.

Key Findings

Funding
Australia increasingly has competitive levels of early stage funding. However, this is reliant on recent growth in early stage funding continuing, and being available to a range of companies in different industries. To support this growth, Governments can use a mix of direct and indirect investment measures.

Talent
Shortages of talent with tech training will continue to be a challenge for Australia. This is driven by a generation of low take-up of tech training by domestic students which is beginning to correct. Ensuring Australia's tech ecosystem has sufficient tech talent will require a whole-of-system approach by governments and industry.

Infrastructure
We focus on incubators as one example of important infrastructure for startups. High level data suggests that Australia has fewer incubators per 100,000 tech workers than most competitor countries. Within Australia, the distribution of incubators varies, with Queensland having the greatest density of incubators for general tech startups.

Regulation
Modernised and fit-for-purpose legal frameworks are an important foundation for our tech ecosystem, in particular, underpinning stronger cybersecurity. Legal reform is one of four essential components to improving Australia's cybersecurity and in this section we highlight five priority areas for reform.

What do startups need?
This chapter explores the competitiveness of the Australian ecosystem for startups. Competitiveness is gauged by the availability of the key inputs to growth, such as capital and talent. When Australia's ecosystem has greater availability of these inputs to growth we are able to get more startups on the playing field.

Between start to Series A, startups usually need direct access to the following:

- **Funding:** relatively small amounts of readily accessible funding to turn their ideas into early products.
- **Talent:** skilled technical talent to help founders (particularly non-technical founders) to realise the first iterations of their idea.
- **Infrastructure:** physical technical infrastructure such as cloud computing, or lab space for deep tech companies, as well as facilitative infrastructure such as incubators which can provide the support and guidance for founders to develop their ideas and build networks.

Indirectly, startups need an environment that is conducive to innovation and new technology adoption. This means startups indirectly need:

- **Regulation:** an enabling regulatory environment with strong cybersecurity

Funding

Australia's early stage funding environment is improving

Early stage funding in Australia has historically been lower than in competitor countries on a per capita basis[9]. In 2021, there was $12 in angel and seed funding invested per working age Australian, approximately 30% less than Canada, as shown in Exhibit 9. However, Australia has seen some of the strongest growth in seed funding in recent years. In Exhibit 9 we show that Australia has had the second-fastest growth in seed funding between 2013 and 2021, just behind Singapore.

The challenge will be ensuring that recent growth does continue despite the worsening macroeconomic environment. Given the broader macroeconomic conditions, we recommend this forecast be viewed as a possible but uncertain outcome. To raise the likelihood of this outcome, we need to ensure that we are supporting continued growth in early stage funding. It is vital that Australia does not lose the advantage in the competitiveness of early stage funding we are close to obtaining.

Extending this perspective to Series A, we consider how close business-as-usual growth will bring us to the United States which currently has the highest levels of funding per capita.

We forecast that by 2030, Australia will have at least the same per capita level of early stage funding as the United States[10] if recent growth in these stages continues.

Angel and seed stage funding per capita
$ per capita, February 2021
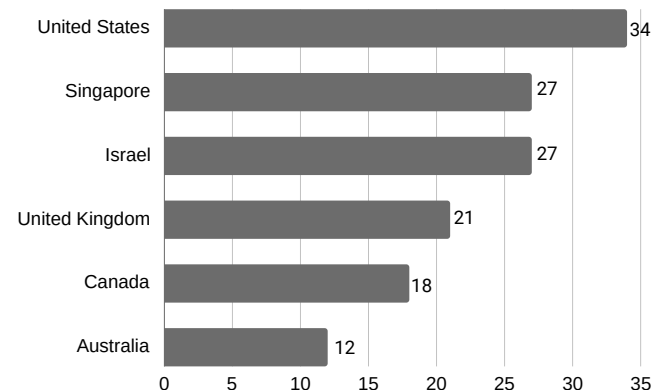
Source: Dealroom

Growth in angel and seed funding
2013 - 2021
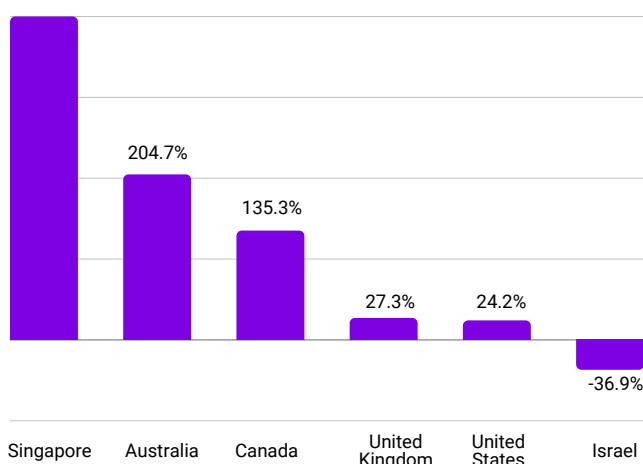
EXHIBIT 10: Matching early stage funding in the United States on a per capita basis

Uplift in early stage funding required to match forecast US per capita funding
$bn, AUD, 2030 projection

Legend: Additional funding over US on per capita basis | BAU growth by 2030 | Current funding

---
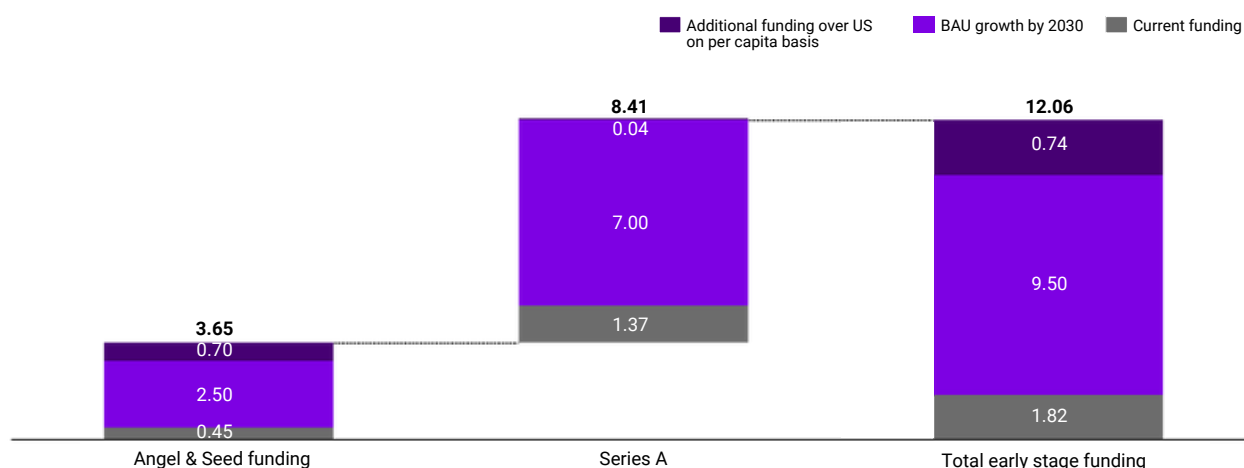
10. If recent growth in early-stage funding continues, we forecast funding levels will slightly overshoot the United States on a per capita basis. Where 'per capita' is calculated using the working-age population.

There are a range of levers for supporting continued growth in early-stage funding in Australia

Increasing the amount of early-stage funding – in line with our 2030 forecast -- is an important step towards making Australia a competitive place to start and grow a tech company in its early years. This is because it puts Australia on a more level playing field. To ensure we can secure this outcome for this part of the startup ecosystem to, governments can use direct or indirect measures.

Direct measures

Direct measures include increasing the amount of grant funding available for startups or investing directly in startups through other means, such as public investment funds. These measures are particularly effective where they offer smaller amounts of funding that come with a minimum of red tape. They can be also helpful in targeting specific segments of startups, or specific applications of technologies, that are a priority area, for instance, startups developing specific technologies such as AI or startups developing solutions to support the energy transition. They can also be helpful in addressing funding gaps from market failures, such as shared infrastructure that benefits multiple companies. To increase the amount of early stage funding, Governments can make across-the-board increases in direct funding measures or make significant commitments in specific areas.

We recommend the design of programs, such as the Industry Growth Program, reflect that Australia has a broad range of strengths in technology. This ranges from existing strengths in areas like Business Software to emerging strengths in areas such as Quantum Tech and AgTech[11]. While it is important for some programs -- such as the National Reconstruction Fund -- to have more specific areas of focus, this should not constrain other government programs' scope.

Indirect measures

Indirect measures are often more broad-based and can be particularly efficient at supporting ecosystems. This is because the measures do not need to be adjusted to account for changes in technologies or market conditions. Indirect measures are often part of tax systems, such as the R&D Tax Incentive or reductions to payroll tax.

To increase the amount of early stage funding, Governments can expand indirect measures for all companies in scope. Governments can also target younger and/or smaller companies by expanding measures for firms within that scope.

When administering broad-based indirect measures, such as the R&D Tax Incentive, it is crucial to provide efficient administration and a reasonable level of certainty – particularly with respect to timing of decisions. Startups, like many small businesses, can face significant uncertainty in cashflow. Almost half of invoices owed to small businesses in 2021 were paid late and 10 per cent paid more than a month overdue according to Xero research[12]. It is essential that vital, broad-based government programs are administered in a way that does not create additional uncertainty for startups.

Facilitating investment

To expand early stage funding, or improve access to it, Governments can also amend regulatory structures that affect investment in tech by non-government sources. For instance, altering the 'Your Future, Your Super' Measures. While these measures did not explicitly restrict investment in tech, they did significantly reduce superannuation funds' incentives to allocate funds towards investments that have greater short-run volatility even if they reliably have high long-term returns. A case study on the 'Your Future, Your Super' measures and their impact on tech is included in Box 2. Reviewing these measures to address disincentives to invest in strategic, high return areas in the long run should be considered.

Regulatory structures that facilitate investment in startups can also be a mean for Government to indirectly expand early stage funding. Through amending the structures like the Early Stage Venture Capital Limited Partnership or the Early Stage Innovation Company scheme, governments can provide greater incentives to expand this funding or ensure breadth of coverage is suitable.

Finally, one additional indirect measure governments can take to increasing the amount of early-stage funding for tech is by increasing later stage funding. The viability of startups in an ecosystem is shaped by a number of factors including the prospects for later stage funding. By increase the viability of the later stages of development for all startups in an ecosystem -- particularly in deep tech areas that require greater later stage funding – investors have greater incentive to support more startups in their earlier stages of development.

11.   Tech Council of Australia, Making Australia into a regional tech hub
12.   Source: Xero, Late payments cost Aussie small businesses $1.1 billion per year

BOX 2: Your Future, Your Super and investment in tech

Every year, superannuation funds in Australia must pass a performance test conducted by the Australian Prudential Regulatory Authority (APRA). The performance test is a benchmark for the eight-year return based on a 'test' portfolio that APRA puts together. If a superannuation fund fails that test, they must alert their members and are banned from taking on new members which means that funds must pass the tests to survive.

This test means that underperforming funds are better regulated than before and this has significant benefits for account holders. However, the structure of the test has had some unintended consequences. One of those consequences has been that superannuation funds reduced their allocations to early-stage tech investments (via 'unlisted equity'). Even though these investments have strong long-term returns, they have can significant year-to-year volatility.

Given the structure of the performance test – particularly the eight-year period for the benchmark return – superannuation funds cannot withstand that volatility even if it's in their members' long run financial interests.

Researchers from UTS have found that 'pass' funds have reduced the percentage of their portfolio to early-stage tech by 3.5%. Based on this change, we have calculated that this could reduce investment in Australia's tech sector by up to $183 billion by 2030. This reduces the amount of funding available for start-ups as well as returns for the members of those superannuation funds. If superannuation funds instead invest in the ASX 300 (or a portfolio of investments with an equivalent return) over that period, members would be $178 billion worse off by 2030.
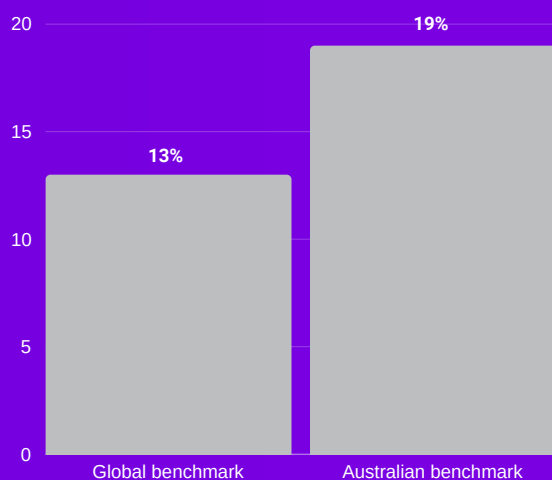
BOX 3: Improving equity in early-stage funding

An important part of building a healthier tech ecosystem is improving inclusion of currently underrepresented groups. This broadens the pipelines into tech jobs and helps ensure we're truly getting the best and brightest people. Diversity also increases the range of perspectives that go into building new technology, products and companies. Increasing the range of perspectives can reduce groupthink, help with problem solving and improve the quality of outcomes as well as competitiveness[13].

Early-stage funding is one of the areas in which we need to improve diversity as a sector. The current focus for many investors is improving gender diversity in founding teams. Research conducted by Blackbird shows that only 13% of global founding teams that received VC funding in 2020 included at least one woman. The Australian share is slightly higher with 19% of companies funded included at least one woman.

Encouragingly, there's a range of initiatives underway to improve the gender diversity of founding teams receiving early-stage funding. VC firms like Blackbird are setting targets, and AirTree is publishing a live dashboard of DEI data internally.

Government agencies are starting initiatives to improve the funding available to female founders including LaunchVic's Alice Anderson Fund, Advance Queensland's Female Founders Co-Investment Fund and the Commonwealth Government's Boosting Female Founders Initiative.

Many organisations run startup fellowships specifically targeted at women to provide a combination of training, mentorship and networking opportunities. Examples include Startmate's Women Fellowship and The NSW Government and Investment NSW's Female Founders Program.

Measuring progress across the ecosystem is an ongoing task. LaunchVic provides excellent sources of data on startups and scaleups including diversity measures of their founding teams. Data from LaunchVic's 2022 ecosystem mapping report shows that the gender diversity of teams appears to be improving. Along the pipeline of companies, we are seeing a greater share of founding teams that include women, as shown in Exhibit 12.

EXHIBIT 11: Share of founding teams funded that have at least one woman

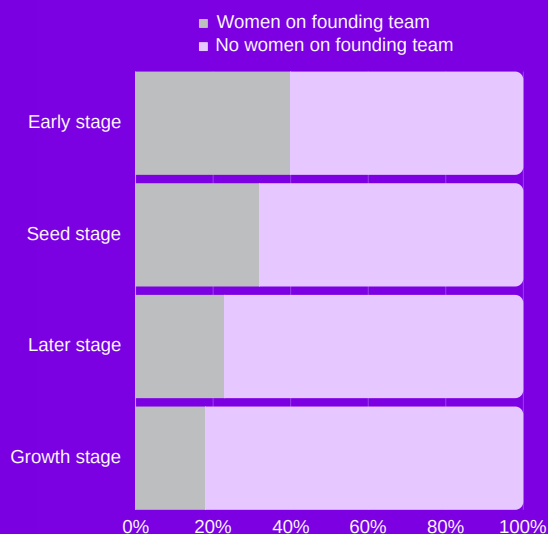**$bn, AUD, 2030 projection**

Source: Crunchbase; Blackbird analysis

EXHIBIT 12: Victorian startups gender balance

$bn, AUD, 2030 projection

Talent

Technical talent shortages are less severe, but domestic pipelines will struggle to meet demand by 2030.

Access to technical talent in the early years of a startup's life is crucial. People with technical skills, such as software engineers, are essential to helping founders turn their ideas into early products. Access to technical talent is particularly important for non-technical founders who may not already have the skills to build products alone.
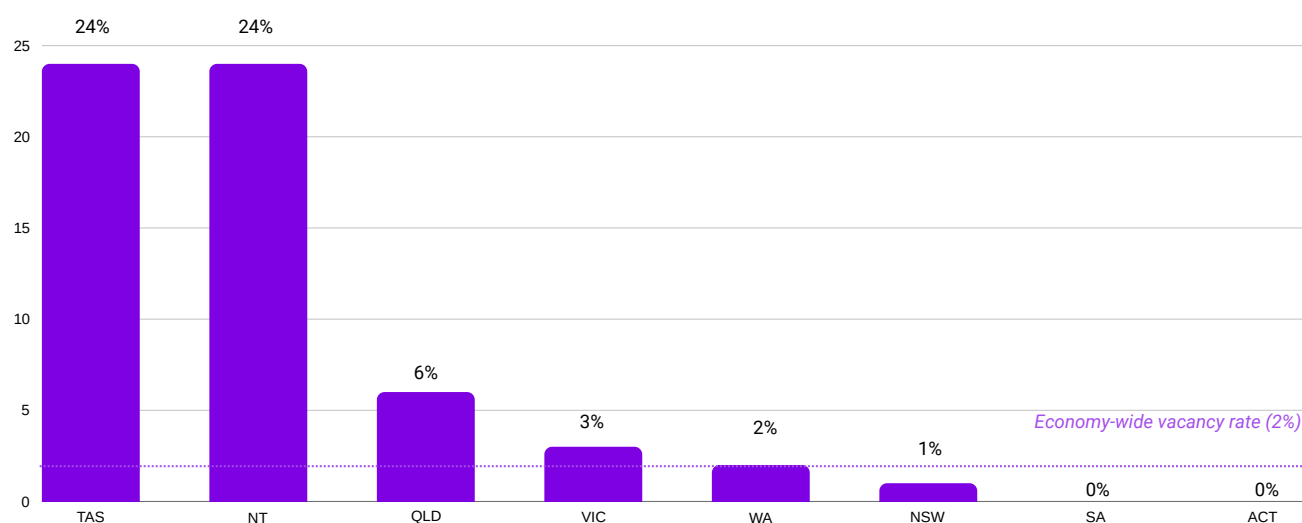
In the last few years, Australia has suffered from significant shortages across a range of technology roles[14]. These shortages were the most severe in technical roles, particularly for those jobs with required experience.

Tech workers are still in high demand[15] but recent data shows that the shortages are easing. The national vacancy rate for Software Engineers now matches the economy-wide rate, as shown in Exhibit 13. But there is significant variation in the availability of this talent across States and Territories.

Lower vacancy rates suggest that shortages of Software Engineers in New South Wales, Victoria and Western Australia are lessening but vacancy rates for Software Engineers in Queensland are still triple the national labour market average. Tasmania and the Northern Territory also suffer from severe shortages of Software Engineers, with vacancy rates 12 times the national average.

Despite the easing of shortages in some states, we still expect a shortfall in coming years without significant action.

Historical gaps in domestic training pipelines mean the Australian labour force cannot meeting rising demand. This is because domestic students' uptake of tech degrees at university has not matched the sustained increase in demand over the last 20 years. In 2021, there were approximately the same number of domestic students graduating from tech degrees as in 2002.

This is shown in Exhibit 14. The gulf in undergraduate tech training levels over the last 20 years means there is a generation of missing Australian tech workers.

The upwards trends in course completions are encouraging. At the postgraduate level, we have seen a 150% increase in completions between 2019 and 2021. This suggests there is a significant appetite for retraining into tech among Australian workers.

EXHIBIT 13: Vacancy rates for Software Engineers

%, August 2022

Source: National Skills Commission; ABS
Note: *The national average is weighted by the distribution of software engineers across the states and territories

14. Getting to 1.2 million
15. Tech Jobs Update 2023

EXHIBIT 14 Australian course completion rates, domestic students

Number of students graduating per year

■ Undergraduate ■ Postgraduate coursework
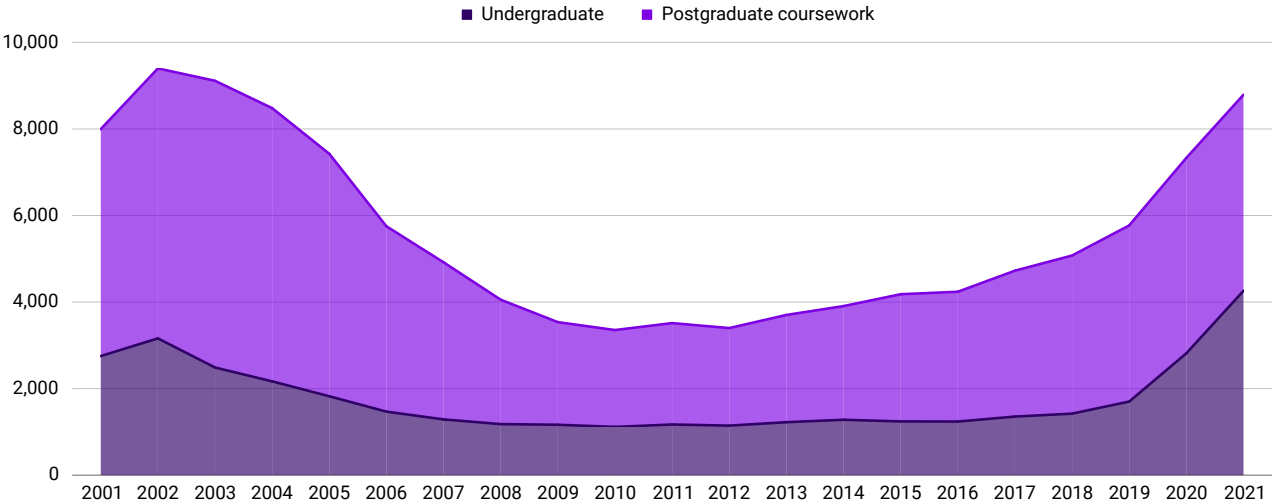
Source: DEWR

Retraining could also be delivered through the VET system which offers shorter, targeted training than most university courses. However, the VET system is not delivering the right training outcomes. In 2022, only 51% of students who completed tech-related Certificate IVs said they had better employment outcomes post-training[16], as shown in Exhibit 15.

This is the second worst field of study by employment outcomes, just ahead of Creative Arts. Addressing the gap between the VET training system and the skills employers are demanding is an important component of meeting the increased appetite for tech retraining across the Australian population.

Talent shortages in general technical skills, such as writing code, also affect deep tech startups by constraining demand across the entire ecosystem. Deep tech startups also face challenges in hiring for more specialised technical skills in Australia. Vacancy rates for AI/ML jobs in Australian startups are relatively high, followed by jobs requiring quantum technology skills or training in robotics & drone technology, as shown in Exhibit 16.

It is difficult to rectify these shortages quickly because training times in these fields can be many years long, requiring postgraduate training. That makes planning for future demand essential to ensuring adequate supply of these skills as well as an efficient migration system.

EXHIBIT 15: Employment outcomes from VET training in tech

Certificate IV, 2022, % students with better employment outcomes post-training
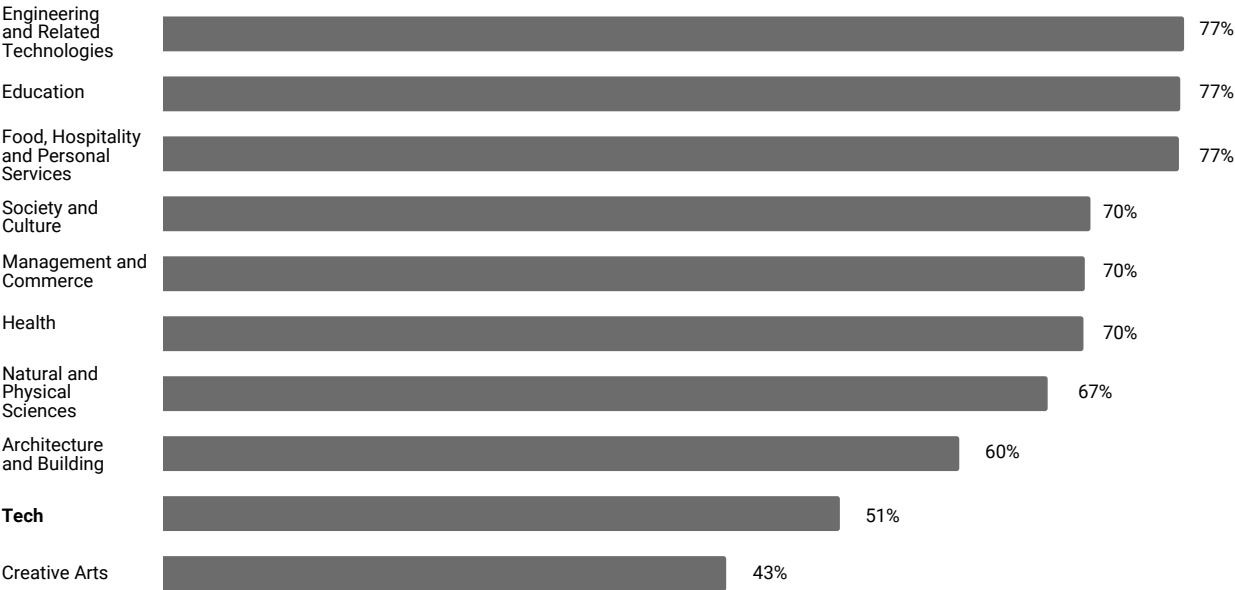
16.   Source: NCVER, 2022

EXHIBIT 16: Deep tech skills shortages

Domain	Shortage rating*	Projected global growth of segment	AUS share of global startups	Vacancy rate in Australia	Stakeholder assessment
AI / ML	High	Medium	Medium	High	High
Quantum Tech	High	Medium	High	Medium	High
AR / VR	Medium	High	Medium	Low	High
Robotics & Drones	Medium	Low	Medium	Medium	High
Geospatial & Surveillance	Medium	Low	High	Low	High

Note: *Average refers to the unique thresholds for individual shortage criteria.
*Shortage rating is the average of the shortage criteria. This assumes each criteria is weighed equally.
Source: Dealroom, Airtree, Blackbird, Main Sequence, ABS, Crunchbase, CSIRO, Pitchbook, TCA analysis

Addressing structural talent shortages will require a whole-of-system approach

To ensure that the Australian ecosystem has sufficient technical talent, we need to expand all pathways into tech, which will improve the talent supply for startups.

We expect that by 2030, we will need an additional 600,000 people to join the tech workforce, as shown in Exhibit 17. Approximately 161,000 people will need to come through entry-level training programs including university and VET. The largest inflow of people will come from re-skilling and up-skilling 295,000 workers. Finally, we expect 150,000 people will join our tech sector by migrating to Australia, bringing both technical skills and valuable experience working in other tech sectors.

Australia needs a significant uplift across all pathways into the tech workforce. This means policymakers need to take a whole-of-system approach, ensuring we are expanding all pathways and fixing any 'leaky' parts.

To expand pathways into tech, we need to establish a national modern digital apprenticeship scheme to complement the structure of existing offerings from universities and the VET system. A national modern digital apprenticeship scheme will build on similar work undertaken by many states and territories.

We also need to ensure students are being trained in the skills employers need across both new and established training pathways. Reflecting changing demand for skills in the system can be achieved through a range of measures, including a strategy for recognising industry-led training options in digital and tech skills.

EXHIBIT 17: Meeting the national tech jobs target by 2030

Projected tech sector jobs in 2030
'000, Number of tech sector workers

Sources: ABS, Tech Council of Australia

Infrastructure

Infrastructure for startups can come in multiple forms. Traditionally, infrastructure has meant physical capital, such as telecommunications infrastructure and laboratories. Increasingly, there are also forms of 'facilitative infrastructure' that help startups build networks of funders, customers and supporters. In this section, we examine the availability of incubators as one form of facilitative infrastructure.

The role of incubators

Incubators and pre-accelerators are programs designed to help startups grow faster than they would otherwise. This growth is enabled by providing the startup with a range of support services and sometimes investment. This can include training, access to a pool of potential co-founders and team members, expert advisors, funding as well as trade and investment support. Many incubators or pre-accelerators are run on a time-limited basis with participants joining for a specific number of weeks.

For startups in deep tech areas, incubators can also provide access to specialised and secure technical facilities. This includes labs and clean rooms which allows startups to work safely and efficiently once they've outgrown (or do not have access to) facilities at universities or research institutions. Incubators can also be a focal point for early customers. As an agglomeration of promising startups, incubators are an efficient way to connect startups to potential early customers.

Australia has a relatively low density of incubators compared to our competitor countries. Israel leads the group, with 22 incubators per 100,000 tech workers, followed by Singapore and the United Kingdom, as shown in Exhibit 18. The demand for (or return to) incubators is likely to vary considerably by country. For countries with greater experience in growing tech companies, incubators may be less important because the networks they help to create are already established. For Australia, ensuring we have good access to incubators will be an important part of ensuring we have the infrastructure to be competitive. Importantly, this analysis is not sufficiently granular to take into account the size of incubators and, thus their full capacity. This should be an area for further analysis to inform any future investment.

EXHIBIT 18: Incubator concentration across competitor countries

Number of incubators per 100,000 tech workers, 2023
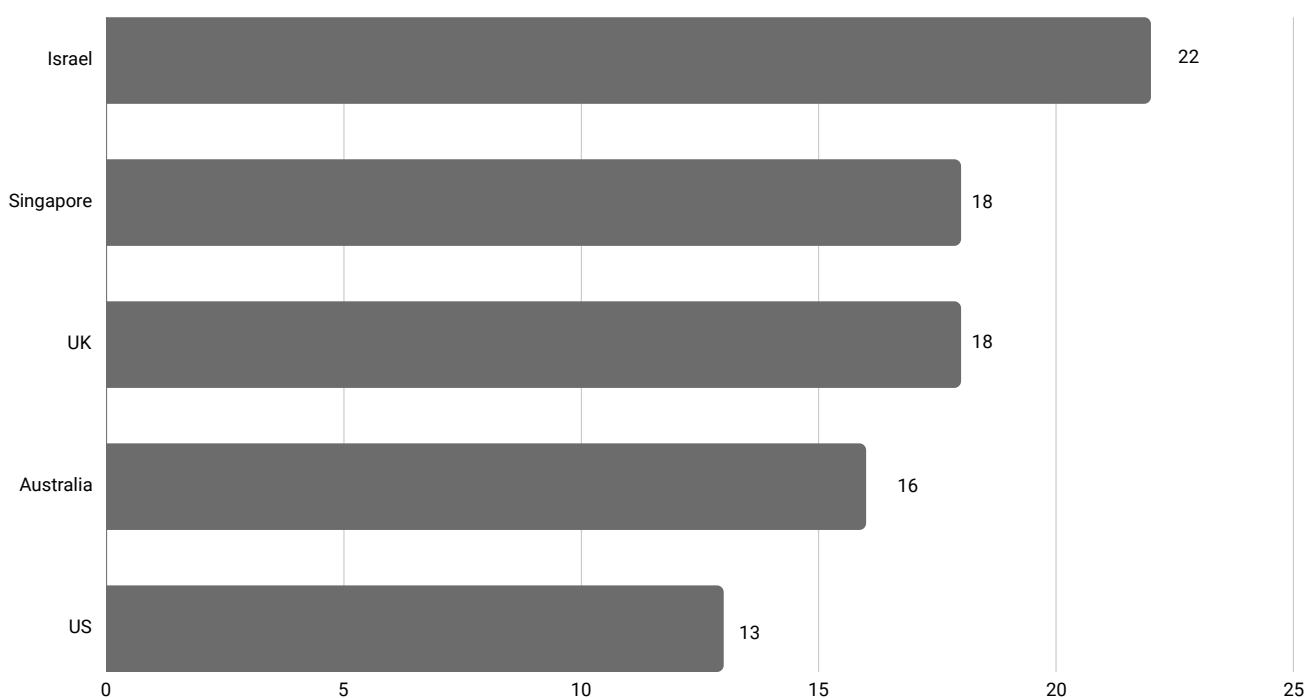
Source: Dealroom, Tech Council of Australia, Comptia, Innovation Israel, ILO, Singapore Government

We have also examined the availability of incubators within Australia for general tech startups separate from deep tech startups. This provides a more granular view of the access to incubators for startups across Australia.

General tech incubators are most concentrated in Queensland and the ACT, as shown in Exhibit 19. This is followed by Western Australia, New South Wales and Victoria. Expanding the availability of general incubators could support more early founders to get traction with their ideas and secure early inputs such as funding and talent.

We have also examined the distribution of deep tech incubators, which focus on emerging tech fields. The access to deep tech incubators is calculated per 1000 STEM PhD students graduating in 2021. We use STEM PhD graduates as a proxy for the allocation of researchers across Australia who are most likely to develop an idea for a deep tech startup. This shows that Western Australia, Queensland, NSW, the ACT and Victoria all have a relatively high density of deep-tech incubators. Ensuring there is ready access to deep tech incubators in the places most likely to spin out startups from research institutions is an important part of ensuring we have the

Governments can use a range of measures to increase access to tech infrastructure

Ensuring that startups across Australia have access to high-quality infrastructure of all types is important to ensuring we maximise their chances of success. Ensuring access to the right kind of incubators across Australia is one aspect of ensuring we have the right infrastructure to grow and scale tech companies.

Governments can take a range of approaches to expanding infrastructure. The most direct path is by Governments independently investing in specific infrastructure. This is more common in infrastructure that is shared across the economy, such as telecommunications networks. Through increasing funding available to startups, Governments can support startups to have the funding they need to invest in the infrastructure that the firm requires. This can be an efficient way to support the early establishment of new kinds of infrastructure, particularly those that are associated with emerging tech fields.

EXHIBIT 19: Distribution of incubators across Australia

Access to general tech incubators
Number of general tech incuabtors per 1000 tech workers

Access to deep tech incuabtors
Number of deep tech incubators per 1000 STEM PhD graduates
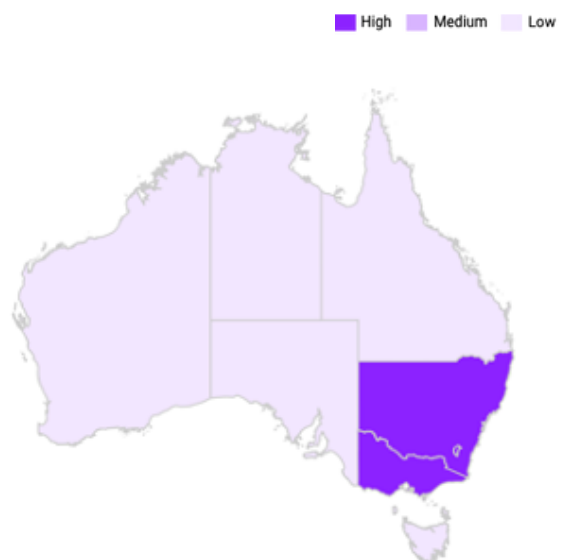
Note: Scores are labelled High, Medium, Low with respect to the average across all states
Source: ABS, Dealroom, DESE, TCA Tech Jobs Update 2023

Regulation

Regulation significantly impacts the health of the ecosystem in which startups are growing. A healthier ecosystem with the right kind of supporting regulation will make Australia's startups more competitive. This makes them better able to scale and compete in global markets.

To support the growth of Australian tech companies, Australia needs a regulatory environment that is proportionate and predictable, interoperable with other jurisdictions. Well-designed regulation can be an enabler of innovation and growth in the digital economy and promote public sector productivity, while poorly designed regulation can harm the capacity of Australia to compete, grow and attract investment.

Key areas of regulatory reform that we need to get right to stimulate dynamism, innovation and productivity in the economy include:

- Positioning Australia as a world leader in cyber security, including by simplifying and clarifying the complex regulatory framework that currently applies to businesses
- Modernised privacy laws that better protect and empower individuals, while continuing to encourage the adoption of digital and data technologies that will drive business productivity and consumer outcomes

- Informed, targeted and proportionate regulation of emerging technologies, such as Artificial Intelligence, which is underpinned by evidence-based assessment of the benefits of risks of these technologies, the current state and gaps in the Australian regulatory framework, and best practices internationally.
- Economy-wide competition and consumer protection laws, underpinned by effective enforcement, that reflect the highly dynamic nature of digital markets (where business models are rapidly evolving and new entrants can quickly disrupt existing models) and that reject a one-size-fits-all approach given the radically different structures, purposes and business models of digital businesses.
- An industrial relations system that upholds the rights of workers while enabling flexible forms of employment that can deliver better productivity and wage outcomes and that do not prevent workplaces from innovating and adopting new forms of technology.
- Targeted and risk-based security regulation that reflects the national security benefits of growing our tech sector. This means ensuring Australian tech firms can maintain and grow access to trusted forms of foreign investment, global talent and overseas markets and that any negative impacts of security regulation that inhibit this are "offset" elsewhere to ensure a net neutral impact on the sector.

BOX 4: The role of strong cybersecurity

Regulation can affect many different aspects of tech ecosystems. In this section, we will focus on the role of regulation in underpinning strong cybersecurity. Becoming a world leader in cyber security would provide Australia with a competitive economic advantage as a tech ecosystem.

There are four essential components to making Australia a cybersecurity leader:

- A clear national cyber security plan that takes a long-term perspective and is underpinned by more effective coordination between the public and private sectors, ranging from threat intelligence sharing to post-incident response and assessment.
- Creating a strong pipeline of cyber and tech talent, a thriving Australian cyber and tech ecosystem, and an uplift in cyber capabilities across the economy.

- Better use and adoption of technologies that can help prevent or reduce the impact of successful cyber attacks.
- A modernised legal framework fit for the digital age that creates the right incentives for organisations to invest in the appropriate collection, use and protection of personal information.

We support reform to Australia's legal and standards frameworks to ensure they are fit for the digital age and improve the incentives for businesses to adopt stronger cyber security practices. Australia's privacy laws, in particular, are outdated and in drastic need of reform. Best practice laws can improve incentives for businesses to adopt better measures to improve the way they collect, store, use and protect personal information, helping to bolster cyber resilience. This includes reducing the potential impact of a data breach resulting from a cyber incident.

Legal reform can support stronger cybersecurity

Reform and modernisation efforts should be approached in a holistic manner underpinned by a clear vision and principles to guide the reform effort, including alignment with the overarching goals of the national cyber security strategy. There are five priority areas of reform:

1. **Privacy Act Review.** We need a comprehensive update of privacy laws that is guided by clear principles, aims to ensure interoperability with international standards (e.g. recognition of GDPR), provides consumers with enhanced rights (e.g. right to erasure) and addresses emerging areas of concern such as Facial Recognition Technology.

2. **Review data collection and retention laws.** Federal and state government laws often require private sector and non-profit organisations to collect and retain personal and sensitive data about Australians. Many of these laws have been in place for decades without review, raising questions about whether businesses are unnecessarily collecting sensitive personal information due to outdated legal requirements. The Government should commission a review of laws requiring data collection and retention to determine whether their provisions are reasonable (e.g. must all data be collected and retained, and for the specified period) to ensure they are not inadvertently driving unnecessary data collection and security risks.

3. **A new review mechanism for data laws.** New laws must balance the benefits of requiring businesses to collect and retain data (e.g. for law enforcement, tax or other purposes) against the risks of this data becoming an attractive target for cyber-attacks. As part of the Privacy Act Review, the Government should consider establishing an enhanced, proactive review process for new legislation proposing to mandate or undertake data collection and retention of personal and sensitive information by government agencies or the private sector. This should include reviewing how the design of the program takes account of privacy and security considerations, and the governance and assurance program that will underpin its implementation.

4. **Review of overlapping disclosure and reporting requirements.** There are overlapping and duplicative disclosure and reporting requirements for data breaches across the federal government, as well as different levels of government, which hamper coordination efforts, slow down the disclosure process, and create unnecessary administrative burdens for companies that have been breached.

5. **Updated guidance on cybersecurity best practices and standards.** Australian companies have expressed a need for clearer guidance on exactly what cybersecurity measures they can and should take to mitigate and minimise risk. The Essential Eight provides this sort of guidance, but it is currently more focused on the use of technology by the public sector and has a bias towards on-premises software solutions. There are also a range of international standards that may be highly relevant to the operations of Australian organisations, such as NIST's Cybersecurity Framework.

Undertaking legal reform is one of four essential components, noted above, to making Australia a cybersecurity leader. By uplifting cybersecurity across the entire tech ecosystem, we create a better environment for startups to grow. This will make startups more resilient to cybersecurity themselves, and also enable them to be more competitive in global markets as they scale.

Improving the environment for startups in Australia

Australia's ecosystem for startups is becoming more competitive, but there are areas that need improvement. While the availability of early-stage funding is improving, there will still be a funding gap to close by 2030. Direct and indirect measures can be taken to increase early-stage funding, such as increasing grant funding and making changes to tax policies and regulatory structures.

Improving the availability of talent, particularly technical talent, is an ongoing challenge. New programs are underway to address some of the limitations in Australia's training system, and we must keep pace (or speed up) this work to ensure we can improve the availability of skilled talent for the whole tech ecosystem.

Examining opportunities to expand access to incubators and other forms of infrastructure is an important part of making Australia a more competitive place to start a tech company. High-level incubator data shows that Australia has fewer incubators per 100,000 tech workers than most of our competitor countries. Extending this analysis to better understand Australia's incubator infrastructure should inform future investment.

To support the growth of Australian tech companies, including startups and scaleups, Australia needs a regulatory environment that is proportionate and predictable, interoperable with other jurisdictions. There are a range of regulatory areas that are essential to supporting the growth of startups, including positioning Australia as a world leader in cybersecurity.

Improving our cybersecurity is key part of ensuring we have a healthy ecosystem for startups. Legal reform is one essential component of strengthening Australia's cybersecurity, and we highlight five priority areas for legal reform:
- The Privacy Act review
- Review data collection and retention laws
- A new review mechanism for data laws
- Review of overlapping disclosure and reporting requirements
- Updated guidance on cybersecurity best practices and standards

Scaling

Scaleups are not just bigger startups; they also grow faster. The rate of scaling for many successful startups is exponential. This means they need rapid access to greater amounts of capital and talent to support this pace of growth. This chapter examines Australia's competitiveness as a place for startups to scale – a crucial point where economies start reaping the benefits of a startup ecosystem.

Key Findings

Funding
Without action, Australia will continue to have significant funding gaps at the scaleup stage. Work underway towards the establishment of the NRF will help, but complementary policy reforms to ensure we maximise the benefits of this program and open up other sources of funding are essential.

Talent
Scaleups need talent with experience in scaling global tech companies and the underlying technical systems. Most of this talent is outside of Australia, and this makes it essential that our skilled migration system is functioning efficiently.

Infrastructure
Australia has strengths in many emerging technology fields, such as quantum. Ensuring scaleups in these fields have the essential infrastructure to grow global companies is a pressing challenge. We recommend considering a range of funding mechanisms to ensure Australia efficiently invests in new infrastructure.

Regulation
For scaleups to succeed, a robust regulatory and cybersecurity environment is vital. Given Australia's market size, regulation must support these firms to scale globally. Ensuring product regulation, such as export controls, enables scaleups to compete globally is critical to the growth of new industries in Australia.

Australia is not a competitive place to scale
For Australian startups, scaling into global markets begins at Series B, and this is when we start calling them 'scaleups'. While scaleups still seek funding at this stage, they are also starting to earn more revenue and will need to secure bigger customers. For scaleups based in Australia, this will generally mean finding international customers who have access to markets much larger than Australia.

As global markets become more relevant for scaleups, policy levers that affect Australia's integration into the global economy become critically important. This means regulation of foreign investment, trade and migration is a focus in this section.

The rapid growth of scaleups can bring substantial economic benefits, including significant numbers of high-paying tech jobs and higher tax revenues. Supporting the kind of scaleup growth requires the following inputs:

- **Funding** – access to greater capital than before, including foreign investors who can support connections to international customers
- **Talent** – access to an abundance of skilled technical and non-technical talent with experience in scaleups
- **Infrastructure** — accelerators that can bring together the right resources for particular types of scaleups; scalable infrastructure for deep tech
- **Regulation** – product market regulations that support the exports of technology goods and services, including free trade agreements, efficiently administered export controls for sensitive goods and digital trade rules

The remainder of this section will examine the availability of these characteristics in Australia and possible options for addressing areas for improvement.

Funding

Australia will face a significant gap in scaleup funding by 2030.

Australia needs a lot more scaleup capital to match the United States on a per capita basis[17]. Collectively across Series B, C and D, Australia will need to increase funding by five times above BAU growth to match the United States by 2030 on a per capita basis, as shown in Exhibit 20.

This means Australia will face an expected gap in scaleup funding of $53bn by 2030. This assumes that the earlier parts of Australia's startup pipeline continue or surpass the per capita United States benchmarks and that the scaleup funding needs of this cohort of startups will be similar to the American counterparts. Encouragingly, there are several Government initiatives being established to expand the amount of scale-up funding for Australia-based scaleups.

While recent raises by venture capital (VC) firms are a promising sign of a growing tech funding ecosystem, these private investors cannot fully bridge this gap. In 2022, Australian VC firms raised $4.5bn[18], which is less than one-tenth of the required $53bn uplift in scaleup funding by 2030. This means that closing this funding gap will require investment by Government and greater foreign investment in Australia-based scaleups. In the next section, we explore the potential uplift.

The potential uplift from the National Reconstruction Fund

One very promising initiative that should substantially increase scale-up funding in Australia is the National Reconstruction Fund (NRF). This is a $15bn public investment fund, which includes a minimum $1bn investment target for critical technologies. This could include quantum technologies, AI and other 'deep tech' areas. This will help to adjust the relatively lower allocations that local private investors have historically made to deep tech areas compared to overseas investors.[19]

An important aim of the NRF is crowd-in private investment. One of the ways the NRF is expected to crowd-in private investment is through making investments jointly with private investors. This is referred to as 'co-investing'. Another way the NRF may crowd in private investment is by making companies more viable for private banking institutions to lend to, or private investors to invest in at different stages.

EXHIBIT 20: Scaleup funding gaps

Uplift in VC funding required to match US per capita funding
$B, AUD, 2030
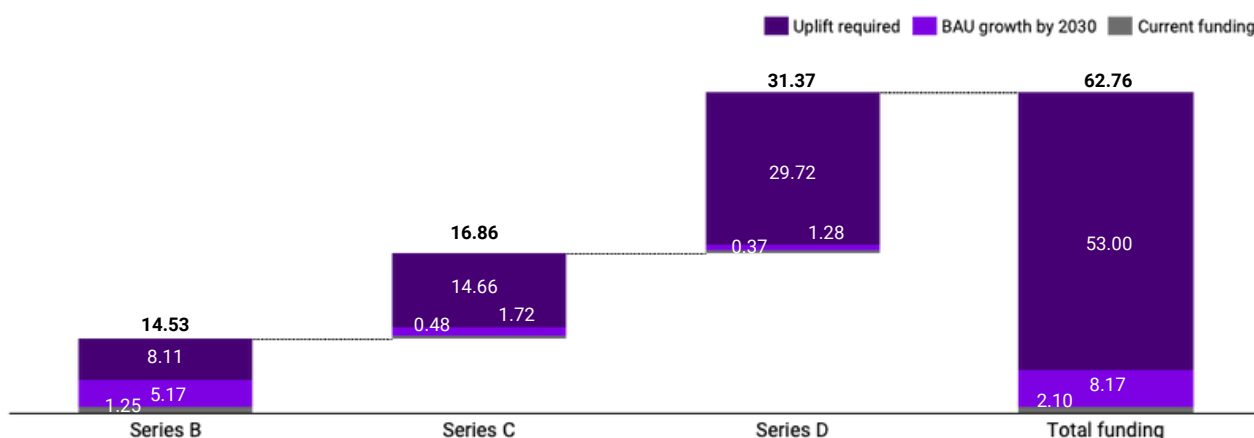
Legend: ■ Uplift required ■ BAU growth by 2030 ■ Current funding

	Series B	Series C	Series D	Total funding
Total	14.53	16.86	31.37	62.76
Uplift required	8.11	14.66	29.72	53.00
BAU growth by 2030	5.17	1.72	1.28	8.17
Current funding	1.25	0.48	0.37	2.10

Source: Dealroom, AIC

Based on this average, we estimate the potential crowd-in from the NRF's investment in critical technologies could be $5.1 billion. This assumes the NRF directly invests $1.9bn in critical technologies, which is a conservative assumption[20]. Nonetheless, this would significantly increase the scaleup funding available in Australia directly and through crowding-in an additional $5.1 billion, increasing total investment to $7 billion, as shown in Exhibit 21.

Crowding-in private investment is a common effect of government investment initiatives. Examples range from the Clean Energy Finance Corporation in Australia to the Defence Advanced Research Projects Agency in the United States. We have examined the documented crowding-in impact of several government investment initiatives shown in Exhibit 21 and find that the average across this sample is $2.7 for every dollar invested.

Realising the potential of the NRF's crowding-in benefits will require ensuring there is sufficient capital to co-invest or otherwise be crowded-in. Based on the historical mix of investment in Australian startups and scaleups, we estimate the likely contributions of major investment sources. Of the $5.1 potential crowd-in, we estimate $0.5bn will come from superannuation funds, $1.2bn from other sources of private domestic funding and $3.4bn from foreign investment. This suggests that Australia will need a 19% increase in funding from each source (including foreign investment) to realise the full crowding-in benefits of the NRF, as shown in Exhibit 22.

EXHIBIT 21: NRF potential crowd-in

Private investment per dollar spent on program
$

Potential NRF uplift
$B, AUD
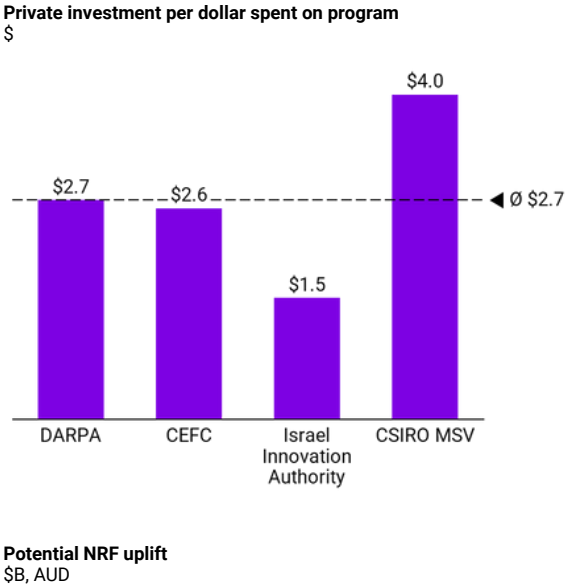
EXHIBIT 22: Uplift required for FDI to meet co-investment needs of the NRF

Annual foreign investment required to meet NRF Crowd-in
$B, AUD
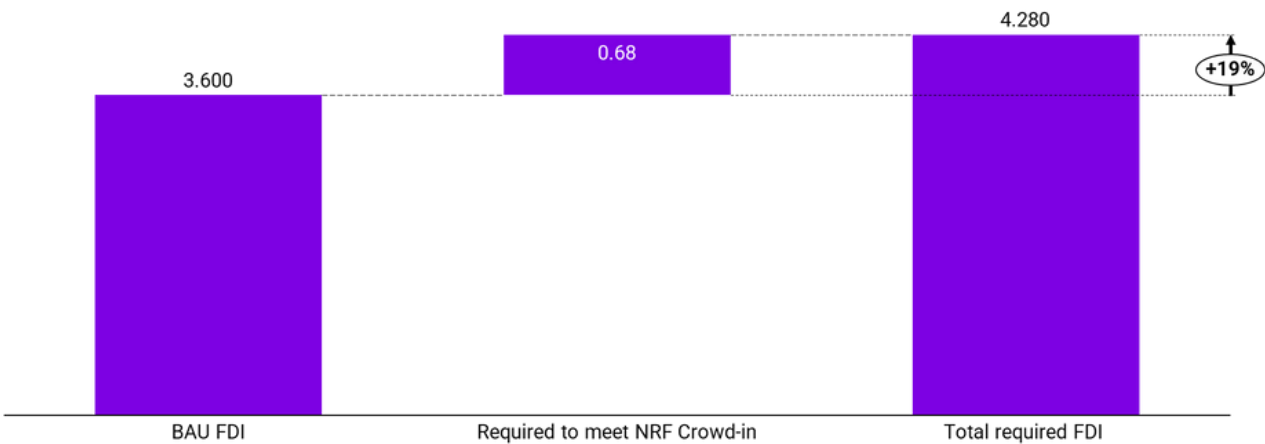
Source: DISR, TCA analysis

20. This $1.9bn is comprised of two parts. One is the $1bn critical technologies target. The other is $0.9bn from critical technology's lower bound share (13%) of unallocated $7bn within the NRF. This lower bound share is calculated based on the current allocation towards critical technologies (13%), which is the $1bn critical technologies target as a share of the $8bn allocated. In an 'upper bound' scenario in which the NRF invests the total remaining unallocated funds ($8bn) into critical tech this increases total investment, including co-investment to $18.9bn.

Realising the benefits of the NRF will require foreign investment regulation to be administered efficiently

To realise the full benefits of the NRF, we need to ensure that foreign investment regulation does not inhibit inflows of friendly foreign capital to Australian scale-ups. Based on the experience of many startups and scaleups, we expect this will require some change to the practice of foreign investment regulation in Australia.

To ensure that foreign investment regulation is fit-for-purpose and supports the NRF, we need to ensure that:

- **Information collection processes are transparent and efficient:** this includes ensuring that information requirements are clear at the beginning of the process and duplication of information provided to the Government is minimised.
- **Timeframes are certain:** uncertain timeframes for investment approvals can cause financing deals to become untenable or very costly for investors. It's important to provide certainty around timeframes and ensure that approvals can consistently occur in a manner that allows normal commercial practices to be carried out.
- **Direct cost of applications is minimised for startups and scaleups:** fees for foreign investment approvals can represent a significant cost for startups, which is in addition to legal fees. Minimising or waiving application fees for startups and scaleups means they could direct these funds towards developing their technology.

In the practice of foreign investment regulation, Australia will need to be more efficient than some other competitor countries to be equally as competitive a destination for investment. However, at present, according to the OECD, Australia is intentionally less facilitative of investment versus most other OECD nations.

Governments should pursue a range of measures to increase scaleup funding

Increasing scaleup funding is a critical step towards making Australia competitive as a tech ecosystem and ensuring the benefits of earlier-stage investments are fully realised. To increase scaleup funding, governments can adopt a range of direct and indirect measures.

Australia's government funding of R&D is currently biased towards indirect measures, as shown in Exhibit 23. Given this bias, and the relatively low level of direct support compared to other countries, we believe that there is a strong case to give greater consideration to expanding existing or adopting additional direct funding measures.

Direct measures include establishing public investment funds, such as the National Reconstruction Fund, Main Sequence Ventures or Breakthrough Victoria. Governments can also directly fund R&D through government agencies such as the CSIRO or through initiatives like Industry Growth Centres. Government can also act as an early customer, particularly for startups and scaleups developing new technologies and fund R&D by awarding contracts on a competitive basis. Another avenue for direct funding of scaleups is by extending grant programs focused on commercialisation to include scaleups (or later-stage startups).

EXHIBIT 23: Government funding of business R&D

Government funding of Business R&D
% of GDP, 2022

	Direct funding	Tax Support	
UK	0.15	0.31	0.46
US	0.11	0.12	0.23
Canada	0.07	0.19	0.26
OECD (avg)	0.10	0.12	0.22
AUS	0.03	0.12	0.15
Israel	0.10		0.10
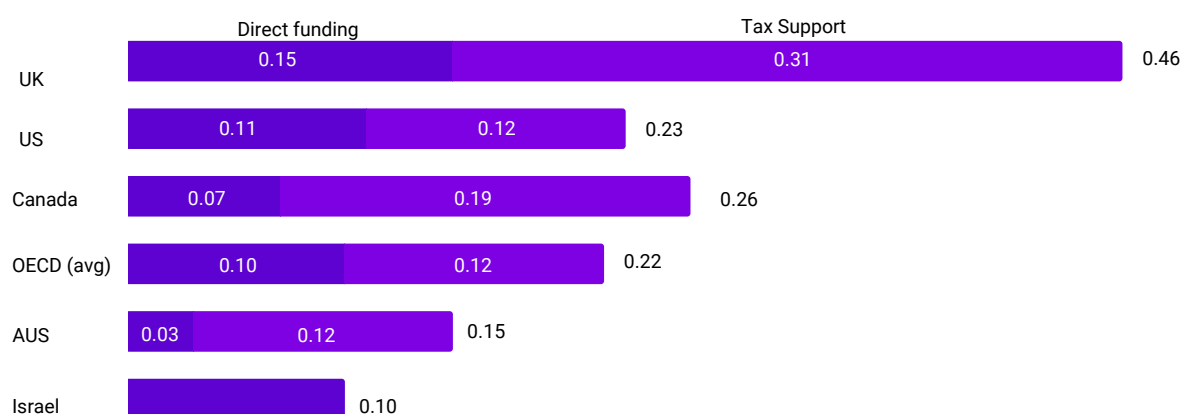
Source: OECD

Indirect measures will still be an important form of Government support for the tech ecosystem. This includes maintaining the R&D Tax Incentive, considering ways to extend greater coverage to larger firms, as well as targeted rebates at the State & Territory level, such as the NSW Tech Central Scale Up Accommodation Rebate. Governments can also indirectly invest in tech by investing in infrastructure. This is particularly relevant in emerging tech fields in which many firms (as well as incubators) are creating or expanding infrastructure in Australia to enable the growth of their businesses.

Greater investment from Government effectively lowers the cost of these firms and emerging tech fields scaling in Australia. There are also indirect measures that enable Governments to stimulate demand for new technologies and early adoption by businesses which is another stream of capital for scaleups. Measures to stimulate demand for new technologies include investment allowances or changing tax structures to improve the tax treatment of investments in technology particularly intangible assets (this is discussed in more detail in Box 5).

BOX 5: Rebalancing the incentives to invest in intangible assets

At present, the Australian tax system provides greater incentive to invest in tangible assets like forklifts than intangible assets such as software.

Within the current rules, intangible assets are included in the definition of a depreciating asset via copyright. The effective life of copyright is 25 years which is much longer than the effective life of many tangible assets. For instance, a forklift has an effective life of 11 years.

This generally means businesses can claim the same amount of depreciation (and re-invest those funds) faster for a tangible asset, than for intangibles. In the case of forklifts, the tax system effectively creates double the incentive for a business to invest in forklifts than software. See Exhibit 24 for an illustrated example.

Rebalancing tax incentives is necessary to help Australia prepare for oncoming challenges. Australia's economic growth in recent decades has been underpinned by physical capital-intensive industries, primarily mining. This has provided significant economic benefits to Australians. However, in coming decades, goods jobs for Australians and higher macroeconomic productivity will increasingly be found in knowledge-based services industries such as tech, healthcare and professional services[21]. To support growth in knowledge-based industries, we need to ensure our tax system incentivises investment in intangible assets (i.e. intellectual property) such as software. New research shows that high-growth companies invest 2.6 more times in intangibles than slow growers[22].

Australia presently lags the OECD average and Canada (which similarly had a mining boom) in the share of total assets that are intangibles. This is shown in Exhibit 25. Encouraging greater investment in intangibles will underpin greater technology adoption and rebalance the Australian economy towards a mix of assets that prepares us to tackle oncoming economic and societal challenges.

Greater investment in intangible assets ensures Australia is equipped to tackle oncoming societal challenges, such as the energy transition. Addressing these challenges will require investment in tangible assets, such as wind turbines and solar panels. But getting the most out of these tangible assets also requires investment in intangible assets like software and the cyber security tools to keep both hardware and software secure[23]. There are analogous examples in solutions to other pressing challenges, such as meeting the needs of an ageing population[24] and other Budget pressures faced by Government.

There are a range of measures the Government could take to addressing the imbalance between intangibles and tangible assets. We would recommend the Government adopt a phased approach that would begin with a temporary investment allowance which provide accelerated depreciation for investment in intangibles. Meanwhile, the Government should gradually adjust the depreciation schedules to rebalance incentives across tangible and intangible assets.

21.   Source: RBA
22.   Source: McKinsey & Company
23.   Source: Wired
24.   Source: Forbes

EXHIBIT 24: Depreciation rules comparison for forklifts and software

Depreciation rules are biased towards tangible assets

$100 $100

$91 $96

$9 $4

Forklift   Software

Businesses have double the incentive to invest in forklifts over software

If $100 is eligible for depreciation, a business can claim $9 in Year 1 if it's for a forklift but only $4 if it's for software.
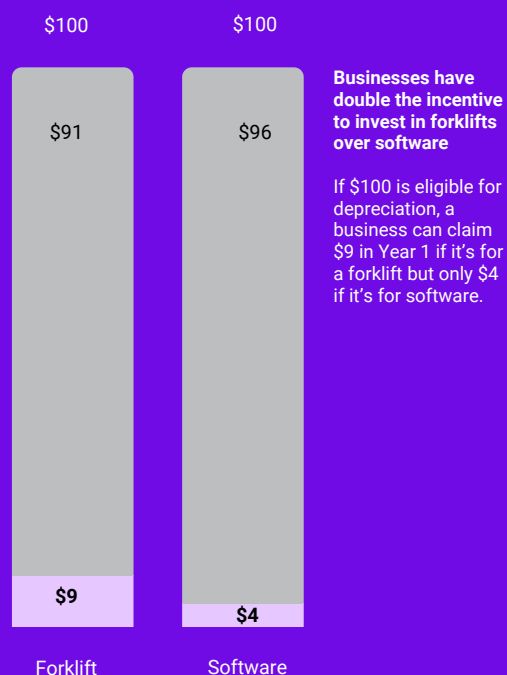
This is because the depreciation schedule is much longer for intangibles
Asset value, $

In both cases the business will get the total $100 deducted from their taxable income.

However, this takes much longer for intangible assets, such as software, reducing the incentive to invest in these areas relative to tangible assets.
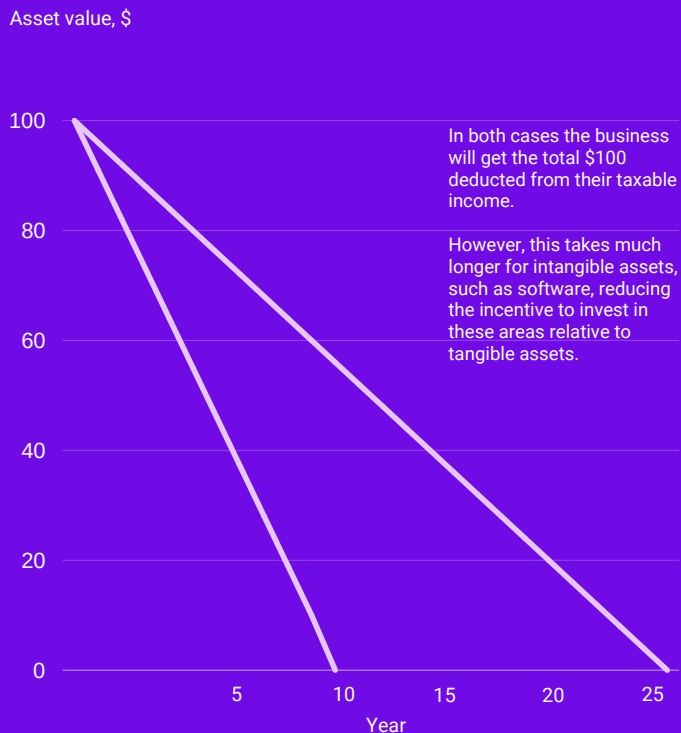
EXHIBIT 25: Intangibles as a share of total assets* – time series

Share of total assets (%), 1970 - 2021

OECD average

Canada
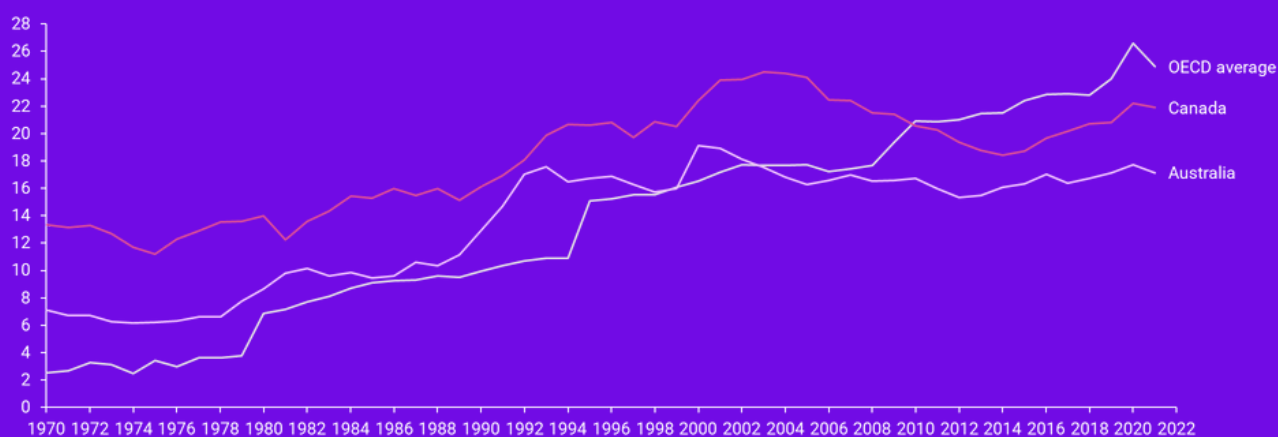
Australia

Note: *Total assets is defined as gross fixed capital formation less dwellings. Dwellings are excluded from this analysis because there are aspects of Australia's tax system, separate from those discussed in this briefing, which heavily incentivise household investment in dwellings which would distort this analysis. Intangibles are defined by intellectual property.
Source: OECD; TCA analysis

Talent

Scaleups need experienced talent to compete globally

As scaleups rapidly grow it is essential to have access to an abundance of skilled technical and non-technical talent. At this point in the development of a scaleup, experience in this kind of work is particularly important so that the business can compete globally. Due to the relatively young nature of Australia's tech sector, we have relatively few people with experience in scaling particularly when compared to the total number of tech workers. Just 1% of Australia's tech workforce has experience in scaling, compared to 17% in Singapore and 13% in the United States as shown in Exhibit 26.

The relative youth of Australia's tech sector means that we also lack large numbers of people with work experience in tech. This means that the bulk of Australia's workforce shortages are in jobs requiring some experience, often between 3-8 years. This is shown in Exhibit 27. This gap in our workforce can only be filled through skilled migration, particularly in highly technical roles that often require years of training prior to joining the workforce.

EXHIBIT 26: Estimated share of tech workforce with scaleup experience

% tech workforce

Singapore	17%
US	13%
Israel	6%
UK	3%
Canada	2%
Australia	1%
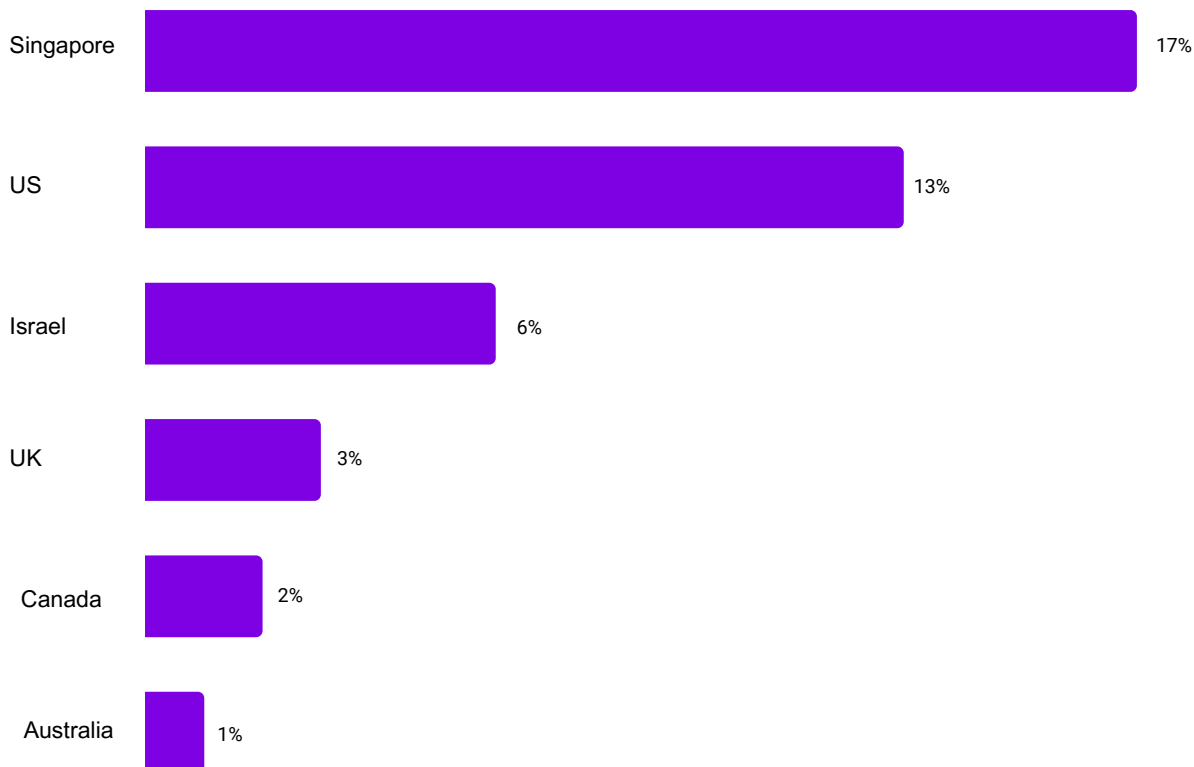
Note: this should be considered an upper bound as it assumes no movement of people between scaleups.

Number of tech jobs in the tech sector, by degree of shortage, 2030

Forecast degree of shortage ▮ High ▮ Medium ▮ Low

Experience	Operational & support (140k)	Creative & commercial (253k)	Digital technicians & trades (223k)	Technical professionals (585k)
Senior (9+ years)	30,000	43,000	11,000	94,000
Mid (3-8 years)	86,000	175,000	125,000	345,000
Junior (0-2 years)	25,000	33,000	87,000	146,000
Example roles	Legal; HR	UX Designer; Product Manager	ICT Support Technician	Software Programmer; Cybersecurity Specialist

Shots on Goal   Tech Council of Australia

Migration is an important source of experienced talent for scaleups

The need for skilled talent with experience in scaleups makes skilled migration very important at this stage. Skilled migration is also an important source of experienced workers for earlier stage startups and established tech companies working on niche areas in the tech sector with very limited sources of talent. Skilled migrants create two benefits. First, they help to immediately address skills gaps. Second, they help train and mentor Australian workers to grow our tech sector.

We welcome the Government's proposed changes to the migration system to ensure it better supports the talent needs Australia's tech sector and the economy-wide need for more tech workers. It is essential that Australia has clear strategic direction for our skilled migration system. Going forward, it is important to maintain this strategic direction in deciding key details such as the salary threshold that defines the proposed streams in the migration system.

It is also important to highlight the importance of the Government's commitment to improving visa processing times for specialised skilled talent. This recognises the intense competition for tech talent globally thus the need for Australia to be competitive.

Australia is an attractive destination for skilled migrants, and many tech companies are able to attract highly skilled, in-demand tech workers from around the world. But the speed of visa processing in the Australian skilled migration system can be a handbrake on this important source of experienced talent.

Visa processing times are still far longer than in competitor countries such as Canada and Israel, as shown in Exhibit 28. While some processing times for some visas, such as the Skilled Nominated (Permanent) have dropped substantially from 1,080 days to 150 days, this is still 15 times longer than processing times for comparable visas for Canada and Israel. Ensuring Australia's visa processing times match internationally competitive levels is crucial to ensuring that all kinds of tech companies, particularly startups and scaleups, can compete in global talent markets on an even playing field.

EXHIBIT 28: Visa processing times for 75% of applications

July 2022, February 2023 and July 2023
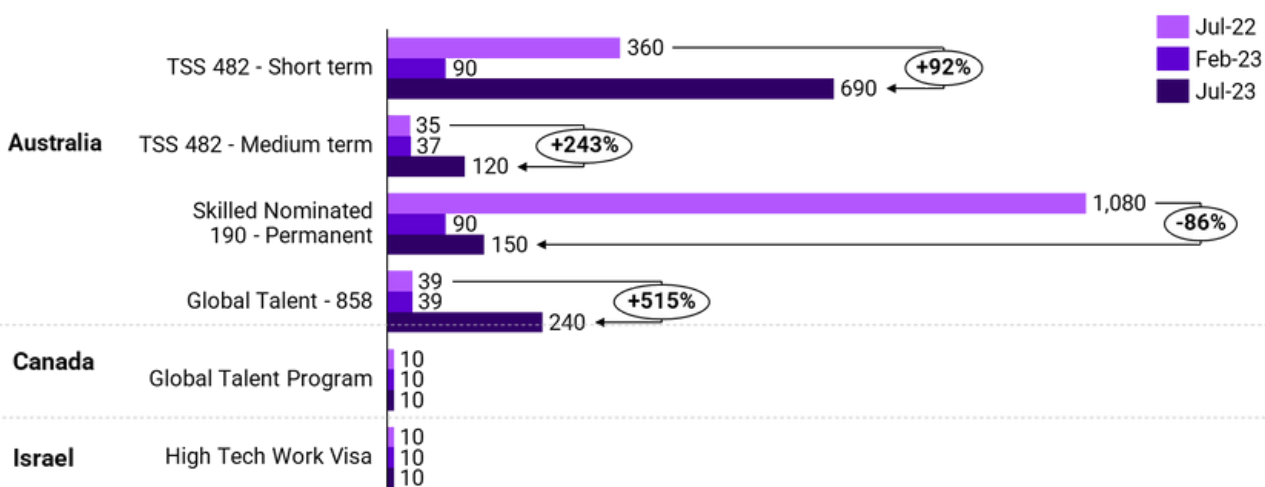
Source: Department of Home Affairs;; Canadian Government; Israel Innovation Authority

Expanding retraining options will be crucial to increasing the number of tech workers and reaching the national tech jobs target

While migration and entry-level training programs are important sources of talent, we forecast that retraining and upskilling will be the largest source of new tech workers by 2030. Retraining and upskilling programs that provide structured training while participants are paid to work are very effective in supporting people to transition into a range of tech occupations[25].

Retraining programs are currently being run or supported by several states, including Victoria's Digital Tech Jobs program and the South Australian Government's partnership with Forte. Work is underway by the Commonwealth Government to establish a national modern digital apprenticeship through the Digital and Tech Skills Compact. Ensuring this work remains on track and the finalised program is delivered in a timely manner will be crucial to ensuring we remain on track to reaching 1.2 million tech jobs by 2030. These programs could also become a new way to efficiently recognise the contribution of industry-led retraining programs, ranging from shorter online courses through to bootcamps or fellowships.

Immediately addressing demand for scaleup talent will require multiple measures

Australia's scaleups face a shortage of workers with scaleup experience and technical skills, with only one in 1000 tech workers having scaleup experience. Skilled migration is a vital resource for scaleups and tech companies requiring experienced talent, but Australia's lengthy visa processing times hinder global competitiveness. While it is important to ensure that scaleups have access to experienced talent, ensuring Australia's tech sector remains on track to reaching our national tech jobs target is important for overall access to talent. Rapid retraining and upskilling are predicted to be the largest sources of new tech workers by 2030, necessitating the successful execution of government initiatives like the Digital Tech Jobs program and the Digital and Tech Skills Compact.

Infrastructure

Australia has access to an abundance of world-class infrastructure for established tech fields

For scaleups developing SaaS or other software-based products based on existing technologies, there is an abundance of world-class infrastructure that enables them to scale globally. This infrastructure is primarily in the form of cloud computing which enables firms to gradually scale their supporting infrastructure commensurate with customer demand.

Emerging tech fields will need support to expand infrastructure

For scaleups developing new technologies, particularly hardware that they manufacture themselves, Australia can be a challenging place to scale. Unlike countries with continuing advanced manufacturing capabilities, such as Germany, the Australian tech sector is effectively re-establishing these capabilities in Australia at an industrial scale.

Scaleups expanding hardware-based technologies take on two forms of risk. One is the conventional business risk that all firms take on when scaling, and the other is the risk that comes with creating new capabilities in an economy. Australia has a strong banking system that is able to effectively gauge conventional business risk, but with a relatively young tech sector there are few financial institutions that can have experience gauging the risk of creating new capabilities. The type of financial product that serves this need is called 'venture credit'. In Australia, venture credit represents approximately 2-4% of total venture funding in Australia. This is much smaller than the 15-20% of total funding that venture credit accounts for in the United States[26]. Addressing this gap in financing is directly linked to scaleups ability to create new kinds of infrastructure in Australia that will support the growth of new capabilities and industries.

In the development of new industries there will be some infrastructure gaps that are bigger than any one firm can solve. There is a role here for Government to take an intentional and comprehensive approach to understanding infrastructure gaps. A good example is the infrastructure audit being conducted as part of the National Quantum Strategy. Addressing these gaps may require multiple approaches. This could include conventional public-private partnerships that Government use to build civil infrastructure like roads and transport links. Governments could also provide grants to individual firms creating new infrastructure or a group of firms that would jointly use the infrastructure.

Regulation

A strong regulatory and cybersecurity environment that supports innovation and growth is a crucial underpinning for rapidly scaling tech companies. In addition, it is important to ensure that regulations which become more relevant as companies grow do not needlessly constrain their ability to scale globally.

25.   Source: Tech Council of Australia, Australia's Tech Jobs Opportunity
26.   Source: OneVentures, Venture Credit in Australia (2022)

Regulation needs to support global scaleability

As a relatively small market, Australia cannot sustain many scaleups alone. Access to other markets and the ability to compete in larger markets is crucial to the success of individual businesses and the overall competitiveness of the Australian tech sector.

Ensuring that laws and regulations that affect the integration of product markets explicitly allow firms based in Australia to export is crucial. Scaleups based in Australia need to be able to compete in markets alongside their competitors. This means that product regulation, such as export controls, need to comparable and interoperable with similar frameworks in other countries.

We also need to consider the cost of complying with these regulations. These regulations add costs which affects Australia-based firms ability to compete with other startups and scaleups in more export-friendly markets. Depending on the cost, it could also affect the viability of certain market segments within Australia's tech sector.

Ensuring product regulation supports the growth of critical and strategic industries, which is contingent on exports and global success, is an important aspect of making the Australian tech sector more successful.

Improving the environment for scaleups in Australia

Australia has a demonstrated track record in scaling global companies, which are largely concentrated in software-intensive segments of the tech sector including B2B SaaS and Fintech. But the data on funding and talent shows that Australia is still a relatively challenging place to scale compared to a range of competitor countries.

To achieve parity with United States per capita scaleup funding by 2030, Australia would need to expand funding by or $53 billion, a sum unlikely to be fulfilled by private investment alone. Government initiatives like the National Reconstruction Fund (NRF), a $15 billion public fund, can help to bridge part of this gap through additional investment and crowding-in private investment. To ensure we maximise the potential of the NRF and benefits for the tech sector, complementary policy measures – primarily foreign investment reviews and skilled migration – need to be administered in a manner that is internationally competitive.

There will continue to be a role for Government investing in scaleups beyond the NRF which will focus on certain industries. A comprehensive approach, blending direct government investments and incentives with measures to cultivate infrastructure, stimulate tech adoption, and revise tax structures to favour technology investments, is key to fostering scaleup funding. This ensures we have a strong funding environment to support the full breadth of Australia's strengths in tech.

As emerging tech fields continue to grow, Australia must ensure they have the infrastructure and supporting regulation to scale globally. To bridge this gap, government intervention is essential to identify infrastructure gaps, as exemplified by the National Quantum Strategy, and devise solutions ranging from public-private partnerships to grants for companies pioneering or leveraging new infrastructure.

Regulation plays a significant role for some scaleups, with product regulation and export controls directly impacting business outcomes. Given the relatively small Australian market, access to and competitiveness in international markets are crucial for scaleups.

Improving the odds of success

If we want to make Australia the best place to start and scale a tech company, we need to address the structural challenges facing startups and scaleups in Australia. Successfully improving the supply of inputs to growth will require governments adopting, augmenting and maintain a range of complementary policy measures.

A framework for supporting more shots on goal

There are several perspectives on the role of policy in supporting innovation. The framework put forward in this report, is grounded in the view that it is the role of governments to ensure the environment is conducive to whole-of-industry growth. This means the environment is abundant in the required inputs to firms' growth, and those inputs are allocated competitively to ensure the most promising firms can scale and succeed. In encouraging the competitive allocation of resources, governments still have a role in coordinating some activities and resources as well as in addressing market failures.

Our framework for more shots on goal has four components:

1. **Strategic direction** – the purpose of setting the strategic direction is to provide clear, measurable aims that the policies in parts (2) and (3) would enable. This gives a simple way to define the objective of any changes and measure success.
2. **Local foundations** — these are the essential policies required to support development of startups and scaleups. Some of these directly affect those firms, such as grants, and others indirectly affect them through their relationships with Government as a customer or other firms adopting technology.
3. **Global integration** – these are the policies that facilitate or regulate access to global sources of the required inputs to startups and scaleups. Ensuring these are working effectively is essential to enabling Australia-based firms' growth, particularly given the relatively small size of the Australian economy and labour force
4. **Measurement** — regular measurement of input availability and important policy function will enable governments to track success towards the objectives set in the strategic direction component.

Within these four components there are different types of policies that governments can use. For instance, within the capital section of local foundations, there are five categories of policies: direct investment, indirect investment, incentivisation of tech adoption, government as an early customer and investment facilitation. These categories are common approaches that we see in many countries with successful tech sectors. Within those categories there are specific policies that governments can undertake.

In the next section we discuss our assessment of the need for action. This examines where policy changes should be prioritised to support growth of the tech sector.

National State of Play

The Australian Government has already a number of levers to support the growth of the tech sector. Several of these policies are working well, such as the R&D Tax Incentive and the Employee Share Scheme program. But in several policy areas there are opportunities to improve in ways that will tangibly improve Australia as a place to start and scale a tech company.

Assessing the need for action

The Australian Government already employs a number of levers in our framework for shots on goal as shown in Exhibit 29. This means our assessment focuses on the need for action in each area and prioritises these needs as 'High', 'Medium' or 'Low'. These results should be considered a high-level guide on the direction of policy changes. The subsequent recommendations highlight specific actions that governments can undertake.

AREA OF FOCUS	LEVER	NEED FOR ACTION	
		Established tech	Emerging tech
1. Strategic Direction		HIGH	MEDIUM
2. Local foundations			
	Direct investment: Public investment fund, Broad grant funding, Focused commercialisation funding, loan facilities	HIGH	HIGH
	Indirect investment: Supportive tax treatment for innovative firms (RDTI in Aus)	MEDIUM	MEDIUM
Funding	**Incentivisation of tech adoption:** broad tax treatment of intangibles; investment allowances	HIGH	HIGH
	Government as an early customer: procurement; Defence investment in R&D	MEDIUM	HIGH
	Investment facilitation: VC investing tax structures (ESIC/ESVCLP); Enabling super funds investment in VCs	LOW	LOW
Talent	**Entry level training:** Strong, broad pipeline of talent from schools; High quality university programs; High quality VET training	HIGH	HIGH
	Retraining and upskilling: Retraining program into tech	HIGH	HIGH
	Facilitation: ESS; workforce planning	LOW	LOW
Infrastructure	**Physical infrastructure:** Funding to build new and maintain existing infrastructure	LOW	HIGH
	Soft infrastructure: Data assets & foundational models; open access to scientific	MEDIUM	MEDIUM
	Facilitative infrastructure: Incubators; Accelerators	LOW	LOW
Regulation	**Modernised legal frameworks** across cybersecurity, privacy & data regulations, Product regulation, Copyright & IP; ethics frameworks	HIGH	HIGH
3. Global integration			
Funding	**Regulation:** FIRB; and other trade frameworks that support access to technology good, services and IP	HIGH	HIGH
	Facilitation: Trade and investment facilitation/support; trade missions	MEDIUM	MEDIUM
Talent	**Regulation:** Migration	HIGH	HIGH
	Facilitation: Migration promotion and targeted support	LOW	LOW
Infrastructure	**Facilitation:** Regional financing to build infrastructure; Access to regional infrastructure;	MEDIUM	MEDIUM
Regulation	**Growth-focused trade policy and international regulatory frameworks** including standards	HIGH	HIGH
4. Measurement		HIGH	HIGH

The recommended prioritisation is a qualitative assessment based on six factors. These factors are:

- **The need for change** - this is informed by the analysis included in this report and extensive consultation with our members as well as experts in relevant areas.
- **Urgency of change required** – whether a change in this policy area is likely to affect factors which will impact the success of Australia's tech ecosystem in the next 1-2 years
- **Impact on growth** – whether a change in this policy area is likely to impact the growth of startups and scaleups in Australia
- **Pro-competitive effects** – whether the policy change is likely to increase competition in Australia's startup ecosystem
- **Cost efficiency** – whether the policy change is expected to be relatively impactful for the cost required
- **Ease of additional policy change** – whether any additional policy change in this area is likely to be relatively straightforward, highly complex or something in between

The results, shown in Exhibit 30, are the average of the ratings against those six factors for each policy lever.

This assessment shows that our national state of play is mixed. All areas of focus – capital, talent, infrastructure, and regulation –have at least one policy area rated 'High' in terms of need for action. This reflects that there are urgent policy changes required across a range of areas.

However, it's also important to note that there are several areas in which we're doing well, thus they have 'Low' ratings in terms of need for action. For instance, the facilitation aspects of both Capital and Talent. In these areas, Australia has competitive facilitate frameworks such as the Early Stage Venture Capital Limited Partnership (ESVCLP) and the Employee Share Scheme (ESS) program. While some changes could be made to keep improving these policies, these are not urgent or otherwise score highly on the factors considered in our assessment. In the remainder of this section, we will discuss the need for change across the four main areas of the framework.

1.Strategic Direction

Australia currently has clear strategic direction in several emerging technology areas, notably quantum technologies via the National Quantum Strategy. The Rapid Response Information Report: Generative AI is a good example of a concise and timely approach to providing strategic direction.

However, we do not have a comprehensive strategy or broader source of strategic direction from Government for the future of Australia's tech sector. Setting this direction would provide greater clarity in coordination of policies across Government that affect the growth of the sector.

2. Local foundations

Areas that are working well include investment facilitation structures like the ESVCLP, ESS and Early Stage Innovation Company (ESIC). While there could be changes made to these programs in the future to continue improving them, there are not any critical issues to address in these areas at this time.

One policy change the Government could undertake is revising the structure of the performance tests for superannuation funds, in particular by lengthening the period over which the performance test is applied. This is further explained in Box 3.

Priority areas for action
There are a number of priority areas for action across both established and emerging tech. It is important to highlight that there is already work underway by Government towards policy changes in these areas. Ensuring these changes are implemented successfully will be crucial.

The priority areas for action across both established and emerging tech are:

- **Direct investment** – the Australian Government has recently passed legislation creating the National Reconstruction Fund (NRF). Ensuring that complementary policy levers, such as foreign investment review processes, are working effectively to support co-invest will be crucial to the NRF's success. There are also reviews underway of several grant programs at the Commonwealth level. We recommend these reviews take into account the relative funding gaps identified in this report and ensure that new programs can address these gaps. We also recommend the scope of these programs reflect Australia's existing and emerging sources of comparative advantage in technologies.

- **Incentivisation of tech adoption** — there are several measures the Government could adopt to better incentivise tech adoption across the economy. One fundamental change, discussed in Box 5, would be adjusting the depreciation schedules to balance the economy-wide incentives for investing in tangibles or intangibles. We would also recommend introducing an investment allowance that would provide a deduction for investments made in tech adoption.

- **Entry level training** — work undertaken through Jobs and Skills Australia, as well as the relevant Jobs and Skills Council, will help identify how we can improve the entry-level training delivered through the higher education system. We would recommend this work be industry-focused and Government act urgently on any recommendations.

- **Retraining and upskilling** – the Government is already working towards establishing a digital apprenticeship program through the Digital and Tech Skills Compact. We would recommend this work continue and greater clarity be provided about the implementation of this work.

- **Regulation**— several significant policy reforms are ongoing in the regulatory areas noted in this framework that are particularly relevant to tech. We make specific recommendations about the direction of legal reforms that will strengthen Australia's cybersecurity.

In addition to these priority actions that affect both established and emerging tech, there are two policy areas that also warrant priority action but primarily for their impact on emerging tech. One area is 'Government as an early customer'. Government is distinctly placed to be an early customer with the ability to bear greater risk and the responsibility to address societal challenges which emerging technologies could help us tackle. We recommend the Australian Government establish specialised procurement programs for emerging technologies that enable young, research-intensive firms to compete alongside more established firms.

Another priority area for action distinct to emerging tech is physical infrastructure. Many emerging technology fields are hardware-intensive, and startups (as well as scaleups) in this space can find it extremely challenging to find the right facilities in Australia. Investing in new infrastructure can be daunting, particularly when there is uncertainty over feasibility and the likelihood of adoption. We recommend the Australian Government prioritise firm-centric funding methods for investing in new infrastructure, for instance, through establishing an income-contingent loan facility for scaleups seeking to create or expand Australia's tech infrastructure for emerging tech fields.

3. Global integration

There are two priority areas for action within the global integration component. One is foreign investment review processes and the other is the skilled migration system. In Chapter 4, we explained the current issues this process introduces and the direction for change required.

More specifically, we recommend that the Foreign Investment Review Board engage an expert provider to conduct a user experience review of their process.

4. Measurement

This measurement component of this framework would establish a more regular process for measuring the efficacy and efficiency of policy areas that affect the growth of the tech sector. We recommend this process be undertaken at least annually given the speed of change in the tech sector.

National policy recommendations

Using our framework for more shots on goal, we've undertaken a review of the need for policy changes at the national level. The results are presented as a 'National State of Play' in Exhibit 30. Based on this review, there are some areas there are priority areas for change which are explained below.

1.Set the strategic direction for Australia's tech sector
Strategic direction provides clear objectives for the wide range of policy areas that support the tech sector. This includes being clear about Australia's strengths and sources of comparative advantage which can enable policymakers to focus their efforts on these areas. While there are several good strategies that support specific areas of the tech sector, such as the National Quantum Strategy, we think there is need for a clear overarching approach to supporting the whole tech sector.

- **Develop clearer whole-of-economy strategic direction for tech,** this could be enabled through a national tech strategy, including measurable, time-limited goals akin to the national tech jobs target. This strategy could also identify the key policy levers Government has to affect these goals and the broader growth of the tech sector.

2. Expand investment into Australia's scaleups
The lack of scaleup funding is a significant source of weakness for the Australian tech sector. Immediate actions to increase this funding include ensuring the successful establishment of the National Reconstruction Fund and ensuring that grant programs currently being redesigned actively seek to include and support scaleups.

- **Ensure direct investment into tech address later stage funding gaps**, this includes ensuring scaleups are eligible for grants or other funding opportunities that aim to support tech sector growth. It is also important to have a range of programs that target or include the range of Australia's strengths in tech.

- **Enable scaleups' access to a range of financing options, particularly those scaleups in emerging tech fields.** This could include establishing an income-contingent loan facility for scaleups to assist them in establishing or expanding infrastructure for emerging tech fields.

- **Develop a specialised procurement program for emerging technologies that supports their ongoing development and adoption.** This could be done in a range of forms including traditional procurement approaches to national challenge-style programs, such as the national challenges included in the National Quantum Strategy.

- **Address the imbalance between incentives created via depreciation schedules for investment in intangible assets and tangible assets,** this could include introducing a temporary accelerated depreciation measure or investment allowance for intangibles, as well as fundamental changes to the depreciation schedules.

- **Ensure that the administration of the R&D Tax Incentive reflects the changing nature of how R&D is conducted across the Australian economy and that this remains accessible to the full range of startups and scaleups**, this could be done through regular service design reviews, reducing the administration burden and improving the certainty and timeframes associated with applications for small and straightforward applications in particular.

- **Ensure indirect investment is facilitating efficiently** this could be achieved through altering the performance test for superannuation funds to reflect the longer-term nature of some investments

3. Enable more Australians can move into tech jobs
Tech job are highly-paid, secure and flexible and it's important that we ensure all Australians have pathways into these jobs. This includes increasing the number of Australians choosing to train in tech at University or through the VET system and ensuring this training equips them with the skills that employers demand. Implementing the Digital and Tech Skills Compact is an important pathway to creating a national system for retraining into tech via modern digital apprenticeships.

- **Expand the pathways into the tech sector**, this could include ensuring timely implementation of the Digital and Tech Skills Compact that will establish modern digital apprenticeships, as well as establishing a strategy for providing accreditation for industry-led training options in digital and tech skills

- **Maintain our strong and competitive ESS** and continue to make incremental improvements to ensure it remains accessible to a range of startups and scaleups

4. Ensure policies affecting the global integration of Australia's tech ecosystem are working efficiently and effectively
This includes the administration of foreign investment reviews, the skilled migration system as well regulation affecting product market integration such as export controls. The administration of these areas needs to at least be internationally competitive so that successful startups can access global talent and capital to scale.

- **Ensure that foreign investment review processes are conducted efficiently. This will require certain timeframes, cost effectiveness and the ability to consistently support facilitation of strategic co-investment aligned with the NRF.** This could be enabled by undertaking a service design assessment of current processes.

- **Prioritise the introduction of a specialist skills pathway in the migration system accessible to startups and scaleups with globally competitive processing times,** this could be assured by committing to a service standard for visa processing and expanding the pathways for employer accreditation to include those startups and scaleups funded through the ESVCLP program

- **Enable more startups and scaleups to build international investor and customer relationships and earlier in their growth through trade and investment facilitation programs**, this could be enabled through smaller and more frequent trade missions, as well as supporting foreign investor or potential customers to visit startups and scaleups in Australia.

5. Ensure that Australia's regulatory frameworks and processes support the growth of the tech sector.
This includes ensuring we have:
- Modernised privacy laws
- Informed, targeted and proportionate regulation of emerging technologies
- Effective enforcement of economy-wide competition and consumer protection laws
- An industrial relations system that upholds the rights of workers while enabling flexible forms of targeted and risk-based security regulation that reflects the national security benefits of growing our tech sector

6. Regularly measure and review progress towards making Australia the best place to start and scale a tech company

To ensure we're on track towards the objectives set through the strategic direction component, we need to set measures that will track progress regularly. While there are a number of ways governments review and report on their work, there is currently no comprehensive reporting on the efficacy of the policy levers that affect the tech ecosystems' growth.

We propose these measures are developed by Industry Innovation and Science Australia and reporting processes can be designed to augment existing data and processes. Progress against these measures should be measured at least annually.

- **Establish an annual scorecard for policy areas that affect the growth of the tech sector,** this could include measures of policy areas across Government that affect the growth of the tech sector. This could range from tech-specific programs such as the implementation of the Quantum Strategy through to whole-of-society programs such as visa processing times.

- **Establish a national definition of startup and scaleup to support evaluation of policies and programs that affect them,** this would support more rigorous evaluation by making the intended audience more visible and thus comparable.

States and Territories state of play

State and Territory Governments have an important role to play in supporting the growth of distinctive, local tech ecosystems. This is clearly recognised by State and Territory Governments, who all have clearly defined strategies for the development of the tech sector. The focus and nature of these strategies vary, which reflects the different needs of each state and territory.

While every state and territory has a clear strategic direction, many are not employing the full range of policy levers. The tech policy coverage of each state and territory is shown in Exhibit 31. We encourage State and Territory governments to examine the full range of policy levers available to them in supporting the growth of their local tech ecosystem.

Before establishing new policy levers, we recommend ensuring that the local sources of comparative advantage are well understood and that this understanding is underpinned by an evidence base. Through understanding local strengths in tech, State and Territory governments can most effectively employ new policy levers to support growth.

Across all States and Territories there are some levers that are consistently utilised less frequently but could be very useful in supporting growth. We recommend States and Territories consider several measures that fall under these three policy levers:
- Indirect investment
- Government as an early customer
- Regular reporting on policies that affect the tech ecosystem

While States and Territories have fewer indirect investment measures than the Commonwealth Government, there are still a range of ways these governments can use these options. One common way for state and territory-level Governments to indirectly invest in tech is through subsidising office space or other infrastructure for startups and scaleups.

State and Territory policy recommendations

1. Support local strengths in tech
Each state and territory in Australia has localised economic specialities, and we are beginning to see this come through in Australia's tech sector. Understanding these local strengths in tech can support State and Territory Governments to invest efficiently. We recommend that State and Territory Governments:

- Ensure local sources of comparative advantage are understood and underpinned by an evidence base.

- Explore the potential to employ a greater range of policy levers towards supporting the development of local strengths in tech, particularly indirect investment options such as targeted rebates.

2. Support greater adoption of technology in the delivery of public services State and Territory Governments are responsible for a range of critical public services, many of which could be improved through greater adoption of technology. We recommend State and Territory Governments:

- Explore early use cases of emerging technologies.

- Establish strategies for adopting established technologies to improve public services and support the growth of startups and scaleups.

3. Regularly measure and review progress towards improving the environment for starting and scaling tech companies
- Establish a scorecard to assess the policies and programs which affect the growth of the tech sector.

EXHIBIT 30: Tech policy coverage across States and Territories

Focus	Category	Measure	Examples	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
Strategy			Industry strategy; tech adoption strategy; measurable goals	x	x	x	x	x	x	x	x
Capital		Direct investment	Public investment fund, Broad grant funding, Focused commercialisation funding, loan facilities		x	x	x	x		x	
	Local foundations	Indirect investment	Supportive tax treatment, targeted rebates								
		Government as an early customer	Procurement strategy, direct R&D spending	x	x		x	x			
	Global integration	Facilitation	International trade and investment facilitation	x	x	x					
Talent		Standard training systems	Strong, broad pipeline of talent from schools; High quality university programs; High quality VET training	x	x	x	x	x	x	x	x
	Local foundations	Augmenting the training system	Retraining program into tech	x	x	x	x	x		x	
		Facilitation	Workforce development and planning	x			x		x		
Infrastructure		Physical infrastructure	Funding to build infrastructure for emerging tech; funding to maintain quality of existing infrastructure	x	x	x	x	x		x	
	Local foundations	Soft infrastructure	Data assets & foundational models	x	x	x	x	x	x	x	x
		Facilitative infrastructure	Incubators; accelerators	x	x	x	x			x	
Measurement			Regular reporting on strategy progress;	x						x	x

Shots on Goal   Tech Council of Australia

Defining Startups and Scaleups

This report adopts a definition of startups and scaleups guided by funding rounds. For the purpose of this report, that approach makes sense because it gives us a common basis on which to compare countries.

These funding rounds are often good proxies for the maturity of the company in non-financial ways, such as their headcount or sophistication as an employer or supplier. As a proxy for maturity, these funding rounds can be used as a framework for explaining what tech companies need to succeed and how this changes depending on the maturity of the company.

Companies that are in later stages of funding can still think of themselves as 'startups', particularly if they retain many of their original ways of working. But for the purpose of understanding the needs of different types of companies based on their maturity, we use a bounded definition of these terms for particular funding rounds, as shown in Exhibit 7.

We acknowledge there are limitations to this definition. Most importantly, it doesn't enable us to capture startups that are not VC-funded and thus don't strictly follow these funding stages. The need for access to the inputs listed in Exhibit 32 provides a general overview, and we note that there will be many exceptions to this rule. In Box 6, we propose principles for developing a more comprehensive and holistic definition for 'startup' and 'scaleup'.

One important note on the application of this framework is that startups and scaleups in different segments may need these things at slightly different stages. For instance, quantum technology startups will often need more funding earlier than startups in market segments like SaaS. They may also source more funding from foreign investors which makes the regulation of foreign investment flows more relevant to these startups earlier than may be characterised here. We note these distinctions over the course of this report and account for them in the formulation of our recommendations.

This report considers the competitiveness of Australia across these stages to assess whether we're a great place to start and scale tech companies. We assess this for companies developing established technologies, such as SaaS, and emerging technologies, such as quantum. These are representative cases of Australia's comparative advantages identified in previous research conducted by the Tech Council[27].

EXHIBIT 32: Our definition of startups and scaleups

	Start to Seed	Series A	Series B	Series C	Series D+
	Startup		**Scaleup**		
Funding	Startups generally need relatively small amounts of readily accessible funding to turn their ideas into early technical products.		Access to greater capital than before, including foreign investors who can support connections to international customers and/or provide different kinds of investment		
Talent	In these earlier stages, startups generally need skilled technical talent to help founders (particularly non-technical founders) to realise the first iterations of their idea.		access to an abundance of skilled technical and non-technical talent with experience in scaleups		
Infrastructure	Startups generally leverage commonly-available infrastructure for their segment. This means for startups developing software products the general availability of high quality internet and cloud infrastructure is crucial. For deep tech startups, the availability and quality of research facilities at universities is often a key source of infrastructure.		Accelerators that can bring together the right resources for particular types of scaleups, e.g. deep tech; scalable infrastructure for deep tech		
Regulation	Startups need an enabling regulatory environment with cybersecurity standards and frameworks, privacy & data regulations and frameworks as well as Copyright & IP protections		product market regulations that support the exports of technology goods and services, including free trade agreements, efficiently administered export controls for sensitive goods and digital trade rules		

25.   Source: Tech Council of Australia, Making Australia into a Regional Tech Hub

BOX 6: Developing a more comprehensive definition of startups and scaleups

For public policy purposes, developing a more holistic and comprehensive definition of startup and scaleup would greatly support policy development that affects these firms. To that end, we propose principles upon which this definition could be defined.

While startups and scaleups start small, they have important differences from other types of successful small and medium businesses. These are the most important characteristics of startups and scaleups:

- **Growth profile** – startups develop technology and/or business models that are globally scalable, unlike a successful café whose scale is bounded. This means the growth profile of scaleups is often much steeper than other successful small businesses.
- **Global tradability** – Because startups have globally scalable technology and/or business models, their offering is generally globally tradeable, unlike a successful hairdresser who cannot export their services.

- **Novel characteristics** – startups create something novel – whether it's a technology or the application of technology to create a new business model. This differs from other successful small businesses, such as restaurants, which may create something distinct but nonetheless fundamentally operate on the same business model as most other successful restaurants.
- **Age** – startups are always young, while small businesses can range from young to old. This is because startups either mature to become scaleups, then technology companies, or fail.
- **Deferred benefits** – startups often require significant investment up front to develop their product or service prior to launching and finding their market fit. This means that investors and founders are typically deferring the benefits of the funds they invest in the startups, particularly in comparison to other kinds of businesses they could invest in that have more immediate returns on that investment.