Deloitte.

ACS Australia's Digital Pulse 2025

Today, meet tomorrow

Powering Australia's technology brilliance.

ACS is the professional association for Australia's technology workers, with 41,600+ members across business, government and the education sector.

As the trusted leader in the tech sector, we work to accelerate the growth of a diverse and highly skilled tech workforce, equipping professionals with the skills and knowledge to power Australia. Now and in the future.

We deliver value for our members, businesses and society in four ways:

Community

We foster an innovative and inclusive community dedicated to powering positive change through technology.

41,600+
ACS members

12,600+
Event attendees

Career

We create career pathways to guide technology professionals and ensure Australia has a pipeline of talent with the right skills and knowledge.

50
Accredited institutions

600
ACS Google scholarships

Capability

We set the standard for assessing, developing and recognising the skills and experience of technology professionals.

12,400+
Unique Skillsoft learners

91%
Consider Skillsoft studies relevant

Migration

We assess and support skilled international technology professionals to address critical skills shortages, improve diversity and enrich Australia's workforce.

24,771
Supported migrating professionals

4,264
ACS Professional Year graduates

ACS foreword

ACS Australia's Digital Pulse is a timely and comprehensive assessment of our digital skills landscape. The findings suggest urgent attention is needed. With emerging technology at the forefront of the modern economy, addressing skills gaps identified in this report is essential.

ACS has made valuable contributions to addressing these gaps across the workforce with initiatives like the Young Tech Ambassador Program. We must not only continue to champion initiatives like these that bridge these gaps, but working with other industry associations, employers and government to make sure we find and scaleup the initiatives that show promising results. Together, we can build a resilient workforce ready to tackle future challenges and opportunities, ensuring Australia's position as a global technology leader.

Helen McHugh MACS (Snr) CP
ACS President

The newly re-elected government has identified productivity and embracing new technologies like AI as a key priority. This is a commendable focus for a government thinking not just about an election cycle but the long-term prosperity of Australians. There is no bigger or better productivity reform for our economy than improving how we leverage digital technologies.

Yet to unlock the promised productivity requires both an innovative economy and the skills across the workforce to leverage emerging technologies. Providing the right supports to our innovative startup and scaleup businesses that find new, creative ways to use the growing capabilities of digital technologies so they stay and grow in Australia should be a key consideration for this government.

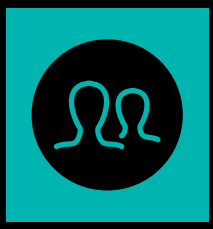
Josh Griggs
ACS CEO

About this report

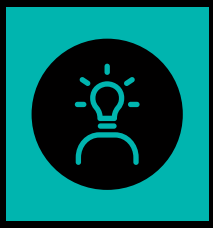
This is the 11th edition of ACS Australia's Digital Pulse written by Deloitte Access Economics for ACS. The report analyses the growth of the digital economy and workforce to understand trends and identify lessons that support the development of a thriving digital economy.

This edition provides a stocktake of the quality of digital skills across the Australian workforce, focusing particularly on skills associated with AI and cyber. It explores how Australia's traditional sources of digital talent are under strain and need to be supplemented through alternative pathways.

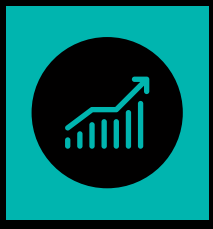
Key data sources



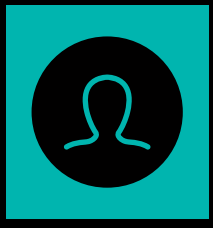
Workforce survey: Survey of more than 1,200 Australian workers including nearly 800 tech workers and over 400 workers across various industries



Leadership insights: Survey of more than 300 C-suite executives including CEOs, CFOs, and COOs.



Statistical data: Public and custom data from the Australian Bureau of Statistics (ABS), Jobs and Skills Australia (JSA), Digital Transformation Agency (DTA), Higher Education data and the National Centre for Vocational Education Research (NCVER).



Industry consultations: Consultation with representatives from tech organisations including DTA, the Future Skills Organisation (FSO), Amazon Webservices (AWS), Microsoft, and Cyber Security Services, Accreditations & Training (CREST).

The report concludes with a discussion around improving the commercialisation and startup environment in Australia. Analysis around the workforce and digital indicators is contained in the statistical compendium.

Content

ACS Australia's Digital Pulse 2025

The technology sector in Australia is a key enabler of the Australian economy and society. The sector contributed $134 billion to the Australian economy in FY24 and employed more than 1 million technology workers who keep the digital economy running by developing and implementing technology solutions.

Yet the importance of digital skills and capabilities is a core requirement for the entire workforce – from young Australians in entry-level roles to C-suite executives. This edition provides a comprehensive assessment of the state of digital skills among the workforce and explores the role of various pathways to build our capabilities.

Digital skills stocktake

The average worker spends 3 hours daily using digital skills amounting to 180 million hours each week across the workforce.

51% lack at least one digital skill required for their role with the use of AI, cybersecurity and data analytics being among the most common skills gaps.

150,000 businesses report major skills gaps, leading to tech adoption issues, lost revenue, and reliance on contractors.

Refreshing pathways to build digital skills

University IT completions have grown by 11%

yet half of graduates believe their qualifications are not relevant for their current role.

Industry certifications and VET are highly trusted pathways to develop digital skills, yet nearly all (88%) of tech job ads still require university degrees.

45% of C-suite leaders report basic digital capabilities in at least one of the five digital capabilities such as the ability to read a digital transformation business case or knowledge on how data is used.

The dividend

Up to 30% more effective use of technology for businesses that reduce their skills gaps based on research from the OECD.

$25 billion uplift by 2035 to the Australian economy if skills gaps among businesses are reduced to the extent of skills gaps in leading businesses.

Mitigating the $63 billion cost of cyberattacks by addressing their rising frequency and sophistication.

Executive summary

Digital technology's importance

Technology is crucial to the functioning of the Australian economy and its future growth. **The technology industry contributes nearly $134 billion to the Australian economy and employs more than 1 million technology workers.** These workers design, develop and deploy technology solutions involving software development and engineering, AI and machine learning, and cybersecurity solutions across every industry.

Digital skills are important for all workers, not just technology workers. Based on analysis of the skill mix of all occupations and the time spent on tasks, the typical Australian worker spends **nearly three hours using digital skills every day, amounting to 180 million hours across the Australian economy each week**. While some of the time will be spent on simple tasks, such as working in spreadsheets or using digital collaboration tools, **69% of time using digital skills involves more complex tasks**.

The digital skills deficit

Despite the importance of technology, most workers lack the digital skills they need. Our survey of more than 1,200 workers finds **that 77% of technology workers and 51% of workers employed across other roles have at least one digital skill required for their current role that they believe is insufficient**. The most common tech worker skills deficiencies are in AI, data analytics, and cybersecurity.

For the technology workforce, an additional issue is whether graduates are job ready. While IT degree completions rose by 11%, **only 1% of surveyed tech employers reported graduates being 'job ready' in 2024 – a drop from 3% in 2023**. This means most tech employers (65%) had to engage in some form of reskilling of graduates to make them effective in their role.

The skills gaps across the workforce are holding back businesses from being competitive and adopting new technologies. Our survey of more than 300 C-suite executives (including CEOs, COOs and CFOs or similar) indicates there could be around **150,000 businesses currently experiencing significant or severe digital skills gaps**.

Improving digital skills: A $25 billion opportunity

Reducing digital skills deficiencies would result in a significant dividend. **Our analysis suggests bridging these gaps could lift productivity and result in an economic uplift of $25 billion by 2035.** This would be achieved if all businesses reduce their skills gap to the size experienced by businesses with the smallest digital skills gaps in the economy.

Improving our digital skills is also critical to mitigating the costs associated with cyberattacks. A cyberattack is reported every six minutes in Australia. We estimate the total cost of cyberattacks to be $63 billion in 2024, with this figure likely to grow as AI enables greater automation and sophistication of attacks. Already, the number of AI-enabled cyberattacks is increasing with the number doubling between 2023 and 2024, and this is expected to grow in 2025.

Refreshing our approach to building digital skills

Business leaders are considering alternative pathways to find skilled candidates and develop digital skills in their employees. In particular, **C-suite executives highly value Vocational Education and Training (VET) and industry certifications as indicators of tech talent. Despite the preference towards VET and industry certifications, 88% of leaders report their business requiring a university degree for advertised tech roles**. While university degrees may be required for some tech roles, this high share signals a clear opportunity for businesses to broaden their definition of who is suitable to fill a role in tech.

Continuous reskilling and upskilling will be vital to ensuring digital skills remain relevant. **Analysis predicts that by the decade's end, 70% of job-related skills will change.** Workers are responding, with an impressive 96% of technology workers undertaking activities in the past year to enhance or maintain their digital skills, while 70% of the broader workforce have done the same. However, ensuring that people's digital training efforts are well-targeted is essential for them realising the return and closing skills gaps.

For example, people employed outside the core technology workforce are less likely than technology workers to be realising benefits from digital training and reskilling. In particular, **only 37% of women believed their digital skills were recognised by their employer and 17% believed having digital skills led to a higher salary**. This disconnect between training and positive outcomes highlights the need to ensure that digital skills training is being properly recognised by businesses.

Building an innovation ecosystem

Australia is falling behind other nations when it comes to generating and commercialising new ideas. Investment in Research and Development (R&D) now sits well below the level of the OECD average. Analysis shows that if Australia increased its R&D expenditure from the current 1.7% of Gross Domestic Product to 2% of GDP, it could gain a $6.3 billion dividend in 2035.

Support for startup and scaleup businesses is lacking with entrepreneurs departing Australia for overseas to access better markets and capital. Analysis of Australian Taxation Office data shows that just under 3,000 Australian citizens are generating business revenue of $350 million in FY22. This does not reflect the individuals who are changing their citizenship before or after they move overseas. One such startup is now currently worth approximately $300 million.

Harnessing the potential of startups and businesses adopting new technology is a priority of the newly returned Australian Government. The Strategic Examination of Research and Development is expected to be released later this year. At the same time, the government is developing a National AI Capability Plan to promote greater adoption.

While these efforts represent important steps, more needs to be done to address the skills deficit in the Australian workforce to ensure we have the skills required to support growth in the digital economy.

Summary of recommendations

This edition of ACS Australia's Digital Pulse identifies ten key actions to build the pipeline of digital skills development and support a more innovative economy.

Action 1

Develop a national sovereign AI strategy

Australia should develop a clear and consultative national sovereign AI strategy that sets out a long-term vision for sovereign AI development, facilitating a coordinated national approach towards regulatory maturity and investment in critical infrastructure, talent, and innovation.

Action 2

Develop an innovation strategy

Australia currently lags behind other OECD countries in the share of GDP it invests in R&D. In FY23, 95% of innovation patents filed in Australia were developed by overseas businesses rather than local businesses. The Australian Government is expected to release the Strategic Examination of Research and Development later this year. This document will be essential for aligning workforce readiness with innovation and should form the basis of a broader national innovation strategy that encourages entrepreneurship across the population and supports startups and scaleups.

Action 3

Government co-investment in scaleups

Australian startups face a 'valley of death' when it comes to finding funding to scaleup their business. This is particularly true for founders who are women and/or identify as First Nations. With many startup and scaleup business supports closing after the pandemic, more could be done to revitalise the scaleup economy. The Australian Government should establish vehicles for co-investment into scaleup businesses in priority sectors and support diverse founders. Returns from investments could then be used by government to invest in other scaleup businesses.

Action 4

Greater incentives for R&D in AI and tech adoption by businesses

Australian businesses are lagging behind other markets in AI adoption. The largest skills gap revealed by our stocktake was in the use of AI. Agentic AI presents new opportunities and capabilities that may be missed opportunities unless more is done to encourage experimentation and adoption. The Strategic Examination of Research and Development and the AI Capability Plan should focus on how to encourage greater R&D into AI, as well as promote greater tech adoption across all Australian businesses.

Action 5

Executives take a digital skills health check

Our research finds nearly half (45%) of C-suite leaders only have 'basic' capabilities in one of five digital capabilities required for their role, including the ability to read a business case for a digital transformation project. C-suite executives should undertake a three-part digital skills health check to ensure their organisation is ready to respond to the growing capabilities of technology. The health check would include understanding their own digital capabilities to help identify any blindspots, the digital capabilities and gaps within their team and how the use of digital technologies fits within their current business strategy. Building the health check into planning would also strengthen their organisation's future strategy, technology governance, and security.

Action 6

Promote entry-level pathways for cybersecurity professionals

Our research finds cyberattacks cost the Australian economy $63 billion per year. Australia will need 54,000 more people skilled in cybersecurity operations and managed by the end of the decade to combat the increasing frequency and sophistication of attacks. Currently, there is a shortage of entry-level roles in cyber, with most existing roles requiring prior experience in software development. Relevant industry associations should encourage organisations to create more entry-level roles to support specialised career development in this field.

Action 7

Fast track a national framework for tech skills

With 39% of working hours involving digital competencies across the workforce, a national skills taxonomy can aid workforce planning and promote skills development. Jobs and Skills Australia is currently developing a national skills taxonomy which should be prioritsed and promoted once released. This skills framework should be aligned to a commonly used skills framework like the Skills Framework for the Information Age (SFIA). The skills framework should be adaptive to effectively measure and keep pace with the rapidly evolving skill needs in digital occupations. Once the framework has been complete, a portal should be built that enables employees across various career stages to identify the skills they need to develop.

Action 8

A national commitment to alternative tech pathways

Despite our survey of C-suite leaders executives showing higher levels of trust in industry certifications and VET qualifications as a reliable indicator of digital talent than university degrees, 88% of tech job ads require a degree. While degrees may be required for some tech roles, the wide use of the requirement is likely preventing businesses from accessing the talent they need. The NSW Digital Skills and Workforce Compact exemplifies proactive change, with partners pledging that 20% of all entry-level tech hires will come from alternative pathways by 2030. This pledge should be adopted at the national level and other jurisdictions around Australia to help promote change.

Action 9

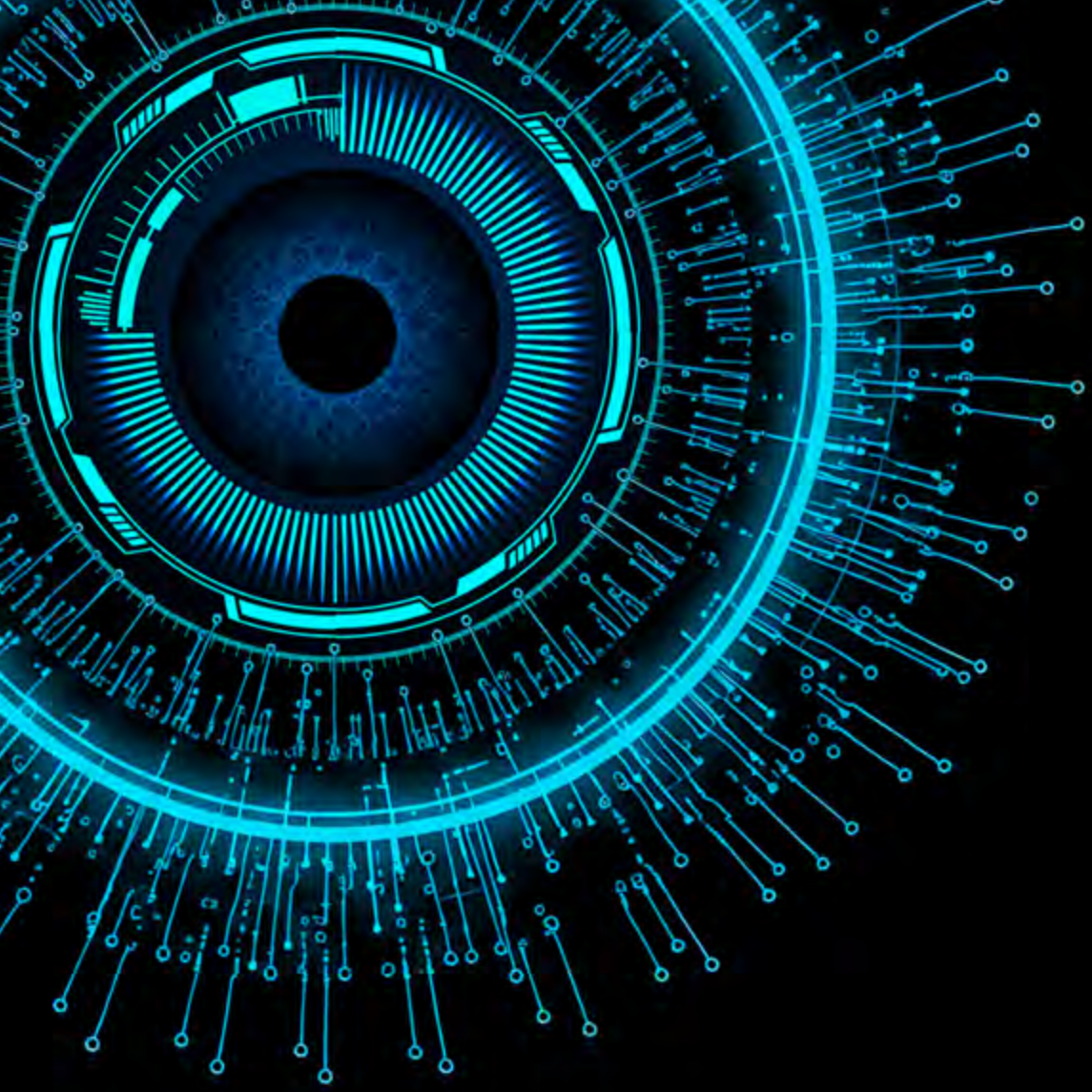
Implement an ‘earn while you learn’ scheme

The share of workers engaging in reskilling or upskilling drops for mid-career workers. The most common barrier is a lack of time and cost associated with undertaking reskilling and upskilling. An earn while you learn scheme could ease this barrier by paying workers a wage subsidy to gain technology skills while working, with the costs shared between business and government.

Action 10

Develop a sovereign system layer for government

Government should fund the development a sovereign system layer for government. Development could be aimed at enhancing reasoning, task orchestration, and safe deployment of globally available models within Australian contexts, and design-led UI/UX improvements to public-facing AI systems.



1 Trends in the digital economy

Growing importance of the digital economy

The tech sector contributes billions to the Australian economy and trade

The technology sector is more critical than ever to the Australian economy. Advances in generative and agentic AI are driving digital transformation and creating the potential for productivity growth. Meanwhile, escalating cyber threats underscore the need for more robust digital defences.

With digital adoption accelerating across all industries, the tech sector's economic importance continues to expand. In FY24, the tech sector contributed nearly **$134 billion in economic activity to the Australian economy, a 3.5% increase from FY23 after accounting for inflation**. Tech businesses made a direct contribution of $84 billion from their operations while also supporting an indirect contribution of $50 billion through purchases from supplying industries.[1]

Australia's technology exports continue to experience growth, indicating sustained global demand for Australian digital goods and services. **In FY24, exports reached more than $10 billion, a 24% increase from FY23. Australian technology imports also grew to nearly $7 billion in FY24.[2]**

Recent US trade restrictions are not likely to directly impact Australian tech exports. While the US market accounts for 21% of Australian tech service exports by value, tariffs are not applied to the export of services. Other major export markets for Australian tech services are New Zealand (14%) and the UK (14%).[3]

Yet growing disruption to international trade relations could indirectly impact demand for tech services through lower global economic activity and investment. The International Monetary Fund (IMF) downgraded global forecasts for real GDP growth by 0.5 percentage points to 2.8% for 2025, partially due to the new global trading environment.[4] Tahe recent tariffs are also impacting the rollout of digital transformation projects, with technology equipment (such as microchips) becoming more expensive as a result of escalating tariff rates.[5]

Innovations in digital technology are expected to be a key driver of productivity. Emerging technologies, particularly generative AI, are enabling businesses to streamline manual tasks completed by workers who can focus more on higher value adding tasks.

Agentic AI represents the next evolution in AI capabilities by integrating probabilistic (e.g Large Language Models) with deterministic (e.g. rules) capabilities to autonomously plan, coordinate, make decisions and execute complex multi-step tasks without human input. **By 2034, the global market for agentic AI is estimated to reach AUD $317 billion.[6]**

Businesses are already beginning to experiment with this emerging technology. **One global survey found that 25% of businesses are planning to pilot or develop proof of concepts in 2025. This share expected to rise to 50% within two years.[7]** Australian businesses are looking to leverage the technology with Relevance AI, an Australian AI agent startup, raising $24 million in its latest fundraising round.[8]

While some businesses are experimenting with new technologies, others are still looking to build more fundamental digital capabilities. To lift adoption rates of AI among Australian businesses, particularly for small- to medium- businesses, the Federal Government intends to introduce an AI Capability Plan towards the end of 2025. The key priorities of the AI Capability Plan include strengthening AI capabilities and increasing AI literacy across the workforce.[9]

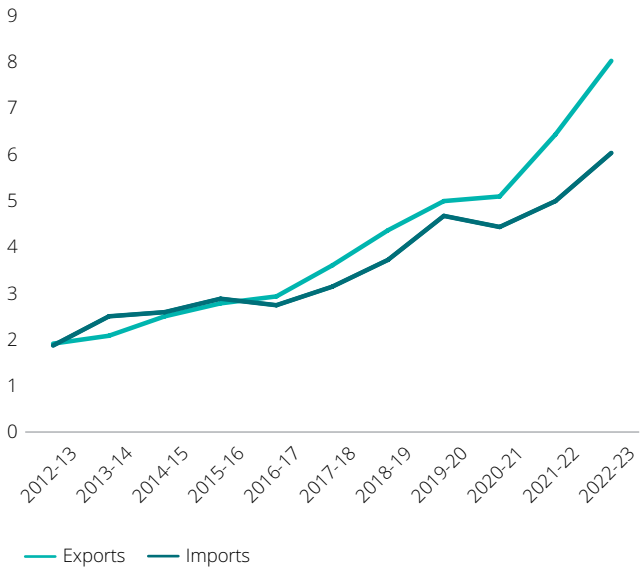
Beyond economic benefits, innovations in the tech sector continue to improve community health and wellbeing. For example, the government has continued to collaborate with the tech sector to upgrade and streamline health care service delivery. The 2025 Federal Budget includes commitments of nearly $229 million to implement and modernise the My Health Record.[10]

Figure 1.1 : Size of Australia's tech sector

$134 billion (or 5%) contributed to Australia's GDP in FY24

$10 billion in tech exports and $7 billion in imports in FY24

Chart 1.1: Technology exports and imports, FY13-FY24, $billions



Source: Australian Bureau of Statistics (2025)

Note: Telecommunications, computer, and information services were considered technology exports and imports for this analysis.

Technology workers enabling the digital economy

Australia will need an additional 230,000 tech workers to meet demand by 2030

The design, development and use of digital technologies across the economy requires a highly skilled technology workforce. **Last year, ACS Australia's Digital Pulse found that Australia's technology workforce reached more than 1 million workers.**[11]

The growth in the technology workforce in the past 12 months has been more subdued than in previous years. Between 2023 and 2024, the number of technology workers grew by 1.5%, compared to an average 4.7% over the past five years.[12] The slowing growth in tech employment opportunities is reflected in the declining tech role vacancies as a share of technology employment (Chart 1.2), which shows a decrease from 5% in 2022 to 2% in January 2025.[13]

This slower growth in tech employment is more aligned with recent employment growth rates across the private sector more generally, where average growth in the past five years was 1.6%. This slowdown in technology employment and private sector employment is likely a result of **slower economic growth across the economy. Deloitte Access Economics' Business Outlook publication predicts that the labour market slowdown will continue through 2025 before stabilising.**[14]

Another factor contributing to lower tech employment growth could be the introduction of AI creating structural change. For example, software programming job advertisements decreased by 10% in the past 12 months alone.[15] One explanation is that businesses using generative AI to supplement experienced software developers has reduced the need for these roles. Over time, the use of generative AI is likely to create more roles as businesses develop more and more applications for software code that can be generated efficiently. While this pattern has been recognised with past technology integrations, the transition of affected workers into new roles that may require new skills needs to be managed.

The combination of these trends suggest that growth in the technology workforce will remain modest for the next two years before lifting to a higher growth rate as the private sector economy picks up and new roles are created in response to emerging technologies being integrated into business operations.

Deloitte predicts that Australia will need approximately 230,000 additional technology workers by 2030. By 2035, the number of tech workers is expected to reach 1.48 million (Chart 1.3).[17]

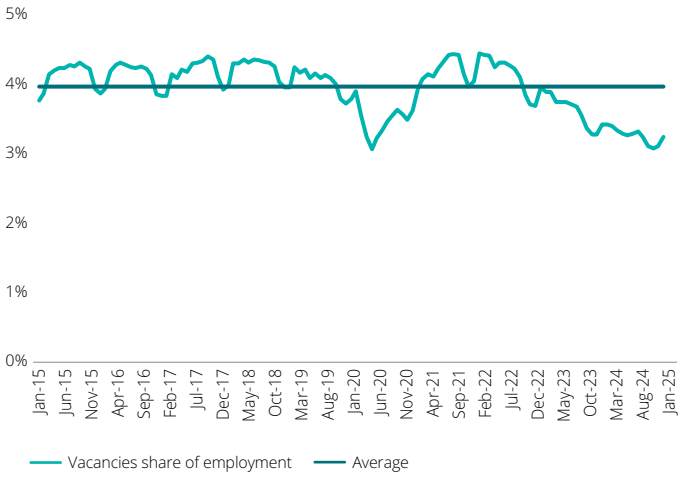
While the technology workforce is a core driver of the digital economy, digital skills are now essential across the whole workforce. Widespread tech adoption requires workers in all sectors to engage in continuous training and development to adapt to changing skills needs.

This next section of the report explores the current state of digital skills in both the technology and the broader Australian workforce.

Defining the tech workforce

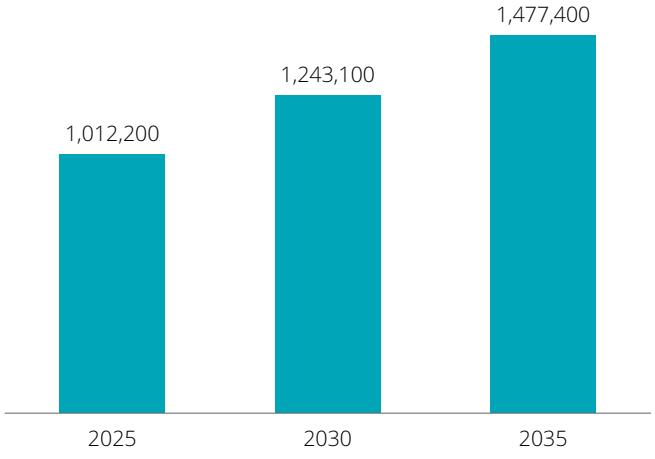
The workforce analysis contained in ACS Australia's Digital Pulse uses ABS occupation and industry classifications and draws on the methodology developed by the Centre for Innovative Industries Economic Research (CIIER) lead researcher, Ian Dennis FACS. The methodology was used in ACS's 2008 to 2013 statistical compendiums and other CIIER analysis. This analysis was foundational in developing an understanding of trends in the Australian technology workforce.

Chart 1.2: Technology role vacancies as a share of technology employment



Source: Jobs and Skills Australia (2025), Deloitte calculations (2025)

Chart 1.3: Technology employment, 2025-2035



Source: Australian Bureau of Statistics custom data request (2025), Deloitte calculations (2025)

Case study: Preparing for tech transformation at CPA Australia

The accounting profession is poised to embrace opportunities through AI adoption

CPA Australia is one of the world's largest accounting bodies representing more than 175,000 members across 100 countries and regions. Chris Freeland, CEO of CPA Australia, discusses how AI adoption can **transform the Australian accountancy profession**, as it continues to play a leading role in business, financial management and economic prosperity.

Chris believes that **AI is a game-changer** that is poised to transform the role of accountants, enabling them to provide new and greater insights to businesses. He notes the potential for AI to move accountants "up the value chain" by providing opportunities to reduce routine tasks, leverage large data sets and enable more sophisticated functions such as advanced analytics, forecasting and fraud detection. Through embracing new technologies, Chris believes accountants can provide deeper insights into financial trends and risks and enhance decision-making capabilities.

While there is both uncertainty and excitement from industry, Chris notes the potential for AI to create **"many more and frankly more exciting jobs"** and compares fears around job displacement to the rollout of Excel spreadsheets, which were once seen as the "death knell" to the profession but are now an accountant's best friend. He explains **the role of the trained professional accountant remains vital** and accountants must maintain a balanced view. He notes the importance for practitioners to understand both the power and limitations of AI tools, use them appropriately and be vigilant to the challenges, for instance through validating the information provided and managing cybersecurity risks.

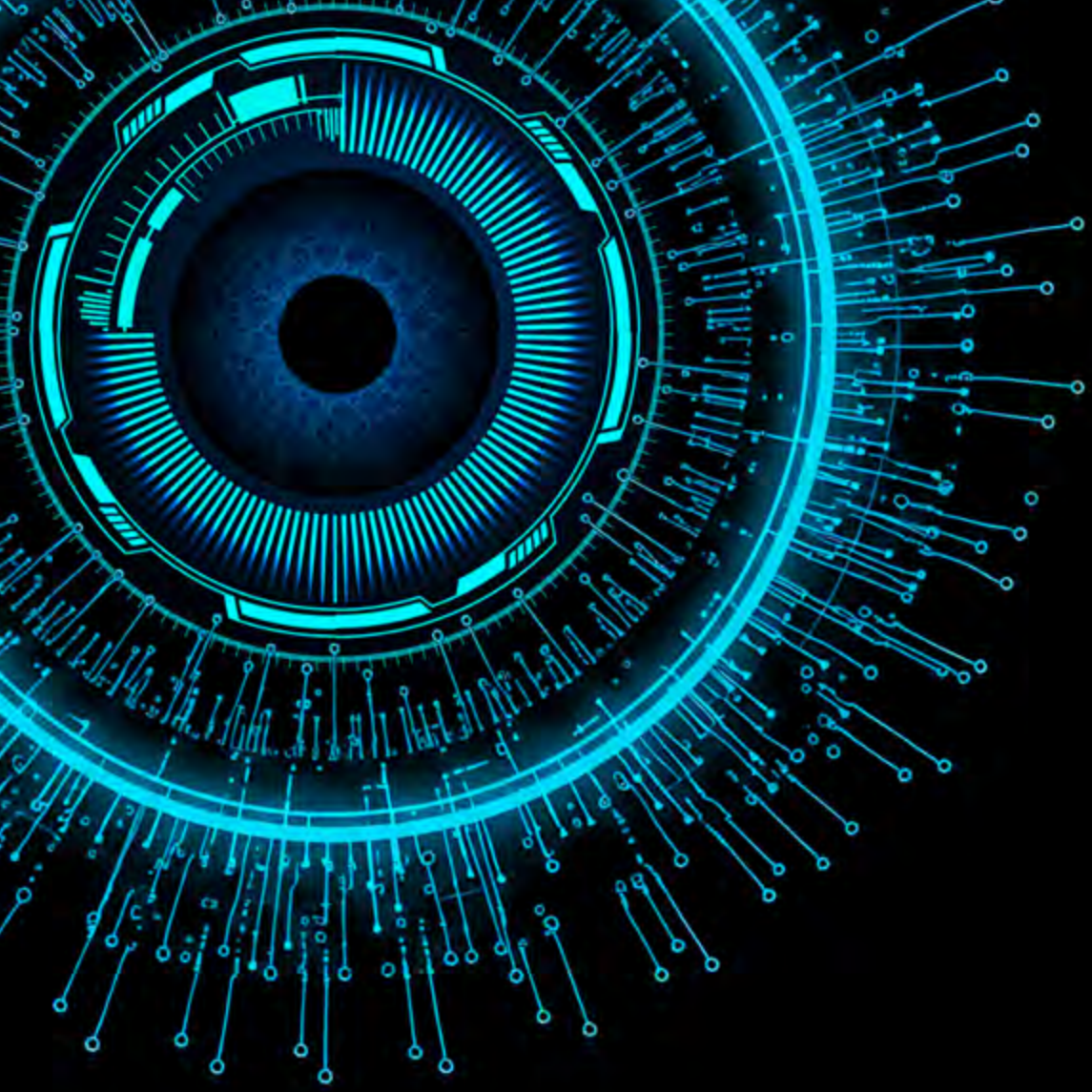
Chris notes there are **opportunities to improve AI use in the profession through upskilling**, particularly for smaller businesses. Chris explains how CPA Australia aims to **expand tech capabilities for all its members** and ensure no practitioner gets left behind through developing inclusive educational resources, sharing best practices and global trends. A key challenge when it comes to workforce upskilling is ensuring content is relevant and accessible for all members. Micro-credentials are available to all members including topics on AI ethics and governance. CPA Australia also seeks to leverage partnerships with organisations like ACS to drive thought leadership and professional development opportunities.

Chris notes the power of new technologies in **changing perceptions of the profession and attracting new talent**, noting these pathways are more important than ever in response to continuing demand for accountancy services and shortages globally.

> AI stirs both uncertainty and excitement but is undeniably a game changer for the accounting profession. The fusion of traditional practices with technology offers accountants opportunities to become **value-adding business partners** in ways that have not been possible before.
>
> **Chris Freeland** CEO, CPA Australia

Value-adding opportunities through AI

- Advanced analytics
- Forecasting
- Risk management
- Ability to quickly audit large data sets
- Fraud detection
- Scenario analysis
- Decision support



2 Digital skills stocktake

Digital skills are the backbone of today's workforce

Workers spend 180 million hours every week using digital skills

Digital skills are essential for every Australian worker to complete digital tasks, whether it's a marketing director using Customer Relationship Management (CRM) software to estimate the ROI of a recent campaign or teams of architects, engineers and construction workers developing and sharing technical designs for a new building or piece of infrastructure. Research by Deloitte Access Economics found that 87% of jobs require digital literacy skills.[1]

Bespoke analysis undertaken for this edition of ACS Australia's Digital Pulse, leveraging JSA and ABS data, identifies these core digital skills and time workers spend using them. **We find 39% of all work time across the Australian economy is dedicated to the use of digital skills. This is equivalent to more than 180 million hours each week.**[2] Digital tasks are more important for some workers with almost two-thirds spending at least 50% of their work time undertaking digital tasks, while one in seven dedicate at least 80% of their time to them.

The most common digital skills being used by Australian workers include managing and undertaking financial activities (7 million hours), verifying records and documents (4 million hours) and writing, editing or compiling documents (3 million hours). These skills are used more frequently than some commonplace non-digital tasks such as undertaking medical tests (2 million hours) and operating production equipment (1.2 million hours).

Digital skills are becoming increasingly important as emerging technologies including AI, advanced data analytics and cybersecurity are adopted by a growing number of businesses. Previous analysis for ACS Australia's Digital Pulse in 2023 suggests that **95% of occupations across the economy and three-quarters of all work time could be augmented or automated by eight key critical technologies**.[3] Of course, as the capabilities of these technologies evolve, the impact of digital technologies on the workforce is likely to grow as new use cases emerge and workers adapt.

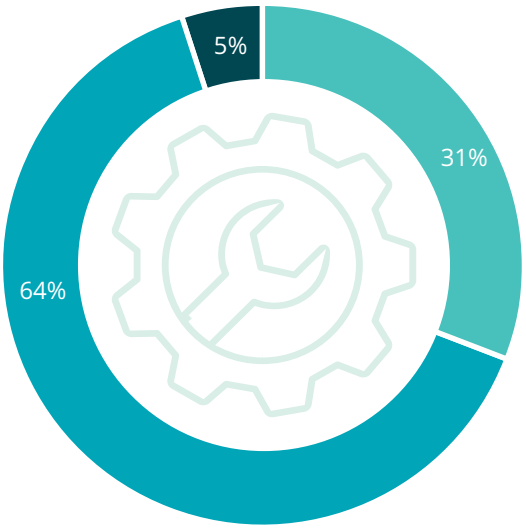
While core technology roles are digitally intensive, **workers across the broader economy account for three-quarters (135 million) of the working hours using digital skills in the Australian economy.**[4] Some of the most digital-intensive roles beyond technology workers include accountants (84% of working time), human resource professionals (71%), and bank workers (64%).

While simple digital skills (such as data entry or communication software) are foundational for navigating the modern workforce, advances in the digital landscape mean that more complex and higher order digital skills are increasingly required. Using the JSA framework on skills, we have categorised the digital skills being used for the workforce into:

- **Basic** skills used by workers such as telemarketers, retail supervisors and survey interviewers.
- **Intermediate** skills used by human resource managers, counsellors, solicitors and urban planners.
- **Advanced** skills used by economists, software programmers, database administrators and actuaries.

We find **the majority of workers (69%) require intermediate or advanced digital capabilities in their role** (Chart 2.1). Almost all industries require a workforce with half or more of all workers possessing intermediate or advanced digital capabilities. Cultivating these higher-order digital skills is vital for establishing a thriving digital economy in Australia.

Chart 2.1: Proportion of workers requiring different levels of digital capabilities



31% **Basic**
Telemarketers, retail supervisors and survey interviewers

64% **Intermediate**
Human resource managers, counsellors, solicitors and urban planners

5% **Advanced**
Economists, software programmers, database administrators and actuaries

Source: Deloitte Access Economics analysis using Jobs and Skills Australia (2024) and ABS (2025)

Note: the classification of digital skills is informed by JSA "digital capability" scores aligned to occupations. Digital capability scores of 1-4 have been classified as 'Basic', scores between 5-7 have been classified as 'Intermediate', and scores between 8-10 were classified 'Advanced'.

The importance of enhancing the quality of our digital skills

Half of the workforce believe they lack the digital skills required for their current role

When examining the quality of digital skills in the Australian workforce, our survey of more than 1,200 workers **finds over half believe that at least one of their digital skills is insufficient for their current role. Technology workers were more likely than workers employed in other roles to believe they have at least one inadequate skill (77% of tech workers compared to 51% of other workers)**.[5] This is likely a result of the higher complexity and evolving nature of digital skills for this cohort.

The skills gaps did not significantly differ between respondents who identified as a man or a woman. Across the whole workforce, **workers under 35 are 15% more likely to believe they have insufficient digital skills, possibly reflecting their earlier career stage.**

For technology workers, the most common skills they believe are currently insufficient for their roles include virtual and augmented reality (42% believe they are insufficient), AI and machine learning (41%), robotic process automation (39%) and cybersecurity (33%).

For the broader workforce, the most common digital skills that are insufficient are using AI solutions for analysing data (60%), working with digital dashboards (40%), using AI solutions for writing content (39%) and cybersecurity (38%) (Chart 2.2). These skills gaps, concentrated around AI and cybersecurity, are likely the result of rapid developments in these technologies.

Workers are already responding to address their skills gaps, with **83% of tech workers and 37% of the broader workforce planning to develop or maintain their digital skills over the next 1 to 2 years**. The top skills tech workers plan to develop include cybersecurity, AI and data skills (Figure 2.1). **Among the broader workforce, using AI tools for both writing and data analysis is a top priority,** highlighting the extent to which AI is impacting roles across the entire workforce.

The rapid evolution of digital skills needed across the economy presents challenges in ensuring skills are up to date. **Becoming more productive at work and keeping up with technical change are the top reasons why workers plan on developing their digital skills** (61% and 56% respectively). Improving the quality of digital skills, as well as ensuring existing digital talent is fully utilised, is key to keeping pace with technological advances.

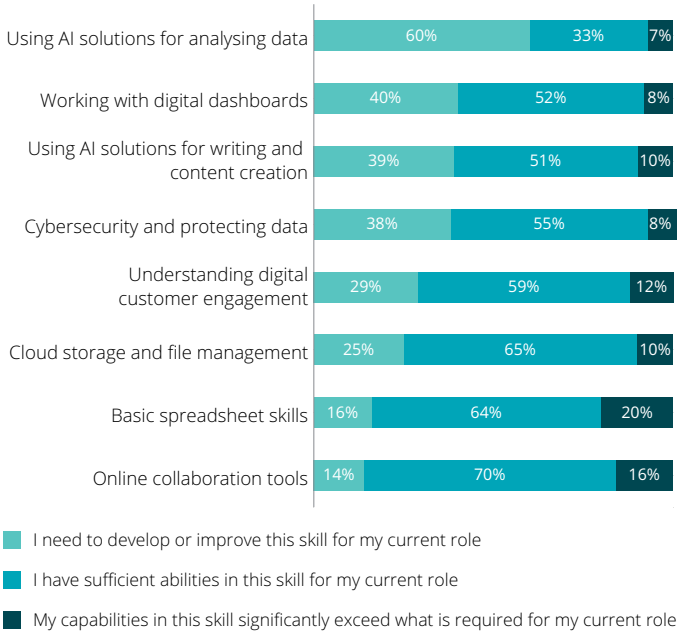
On the other hand, **tech workers were twice as likely to possess digital capabilities significantly exceeding what is required in their current role (61% compared to 28% of workers employed in other roles)**.

Recent migrants are significantly more likely to report having skills that exceed their current role. **Two-thirds (64%) of migrants arriving within the last 5 years believe they have one or more skills exceeding their job requirement**, compared to 44% of migrants who have been in Australia for 5 or more years and 50% of Australian born workers. In a survey of ICT-skilled migrants, 1 in 3 felt they have a job below their skill level.[6]

These findings suggest migrants are significantly more likely to experience an underutilisation of their digital skills in Australia. This is a result that has been identified in previous editions of ACS Australia's Digital Pulse and highlights that the digital talent in our workforce could be used more productively.[7] Other research by Deloitte suggests that closing the underutilisation gap of migrants (across all skills) would be worth an additional $9 billion to the Australian economy each year.[8]

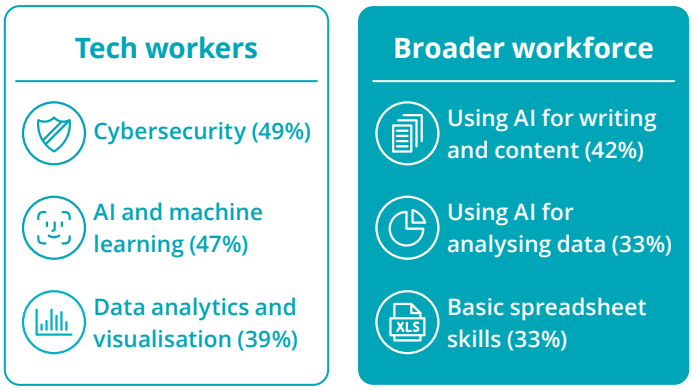
Actions businesses can take to better recognise the skills of migrants in tech include fostering an inclusive culture, managing unconscious bias, creating clear and inclusive job advertisements and ensuring skills-based hiring processes.[9]

Chart 2.2: State of digital skills across the broader workforce



Source: Deloitte Access Economics Workforce survey (2025)

Figure 2.1: Skills workers plan to develop in the next 1 to 2 years



Source: Deloitte Access Economics Workforce survey (2025)

Digital skills gaps are holding businesses back

150,000 businesses are experiencing significant or severe digital skill shortages

Widespread digital skills gaps across the workforce are holding Australian businesses back from being competitive and reaching their potential. Our survey of more than 300 Australian C-suite leaders across a range of business sizes and industries found 15% are currently experiencing a significant or severe digital skills shortage in their business.[10] **This suggests there could be 150,000 businesses experiencing significant or severe skills gaps across the economy.**[11]

While only a relatively small share of businesses report significant or greater digital skills gaps, **we found that nearly all C-suite leaders (96%) report experiencing negative impacts due to a lack of digital skills across their business**. The most common digital skills gaps reported by C-suite leaders are in cybersecurity (45%), AI and machine learning (40%), and data analytics (35%) (Figure 2.2).

These digital skills gaps are pervasive across various business functions, according to C-suite leaders. With technology and data teams identified by 68% of leaders as needing upskilling, it's clear that these teams will need to be at the forefront of lifting digital capabilities. However, **the fact that 84% of leaders recognise a need to enhance digital skills in other areas such as marketing, operations, and customer service indicates that digital proficiency is essential across all facets of the business**.

These skills gaps impact both the operational and financial performance of a business. The most common impacts of digital skills gaps include difficulty adopting new technologies (41%), foregone revenue (40%) and increased reliance on external contractors (38%). There are also increased vulnerabilities that come from a digital skills gap, with **nearly 2 in 5 businesses reporting that digital skills gaps increase cybersecurity risks**. This threatens the security of their business operations and any sensitive data they store on their systems.

C-suite and other business leaders face a number of barriers to developing sufficient digital skills across their organisations, but **the rapid change of technology is the most common barrier reported** (39%). This is unsurprising given the fast-paced nature of the technology landscape, with the recent rise of generative AI and the growing sophistication of cyberattacks, both of which require an evolving skill set within the workforce.

A shortage of candidates with the required skills for the role was the second most common barrier, cited by 29% of businesses. This compounds the issue by limiting the talent pool available to meet these rising technological demands. In a survey of ICT-skilled migrants, 55% cited a lack of Australian job experience was the main barrier to employment.[12] The scarcity drives competition for top talent, escalating salaries and making it more challenging for businesses to attract and retain skilled professionals, further exacerbating the digital skills gap.

Budget constraints, highlighted by 28% of businesses, also impede efforts to bridge this skills gap. Investing in upskilling programs, recruiting specialised talent, and updating technology infrastructure requires substantial financial resources.

For many businesses, especially small- and medium-sized businesses (SMBs), the required investment in digital skills may be prohibitive.

Consequently, businesses may find themselves trapped in a cycle where insufficient investment in skills development perpetuates their inability to fully capitalise on digital opportunities, ultimately hindering innovation and competitive advantage.

Figure 2.2: Top 5 digital skills in shortage

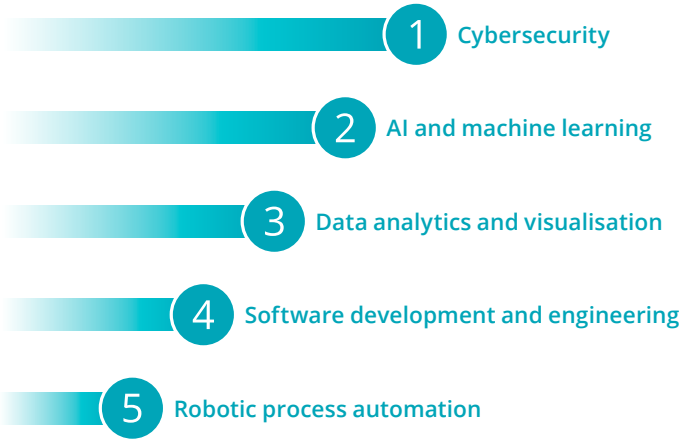
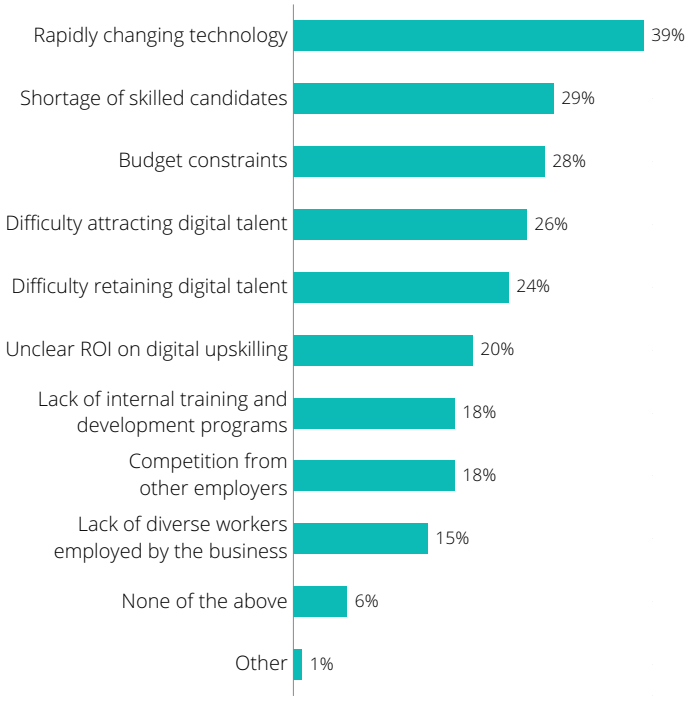


Chart 2.3: Most common barriers organisations face to having sufficient digital skills



Source: Deloitte Access Economics C-suite survey (2025)

Case study: Identifying and addressing skills gaps through SFIA

A globally recognised model that defines skills enabling a future-state-ready technology workforce

The Skills Framework for the Information Age (SFIA)is a globally recognised framework that provides a detailed model for describing and managing skills. Its primary purpose is to **facilitate skills assessment and development for both individuals and organisations**. Since SFIA was developed 25 years ago, the framework has evolved through several iterations in response to the evolving landscape of tech skills. Australia now has one of the largest number of users of the framework internationally.

The framework aims to provide a **standardised approach and common language for defining digital skills and competencies**, which is increasingly important as digital skills needs across all job roles expand and diversify. Workforce Development Manager Lisa Syrek helps organisations to implement the SFIA framework to understand the skills and capabilities of their people, identify what skills they have coming, and understand how organisations can help their people to uplift their skills. This provides organisations with the **evidence base they need to help direct investment, learning activities, strategic planning and hiring decisions**.

SFIA also plays an important role in **enabling staff to move more effectively between different roles** based on their skills profile. Lisa describes how the framework can be used as an objective assessment tool to facilitate transfers to higher skilled jobs within the economy. Lisa explains this can be valuable for women who typically underestimate their own skillset compared to their SFIA assessment scores. For example, Lisa shared how an experienced research librarian was empowered to pursue a business analyst role following a positive SFIA skills assessment, which she had previously considered beyond her capabilities.

The main users of the SFIA framework in Australia are utility businesses such as water, power and health entities, as well as federal and state governments. Lisa advises how often organisations consider implementation of the SFIA framework when they are undergoing a period of digital transformation. ACS will then work with organisations over a period of 12 months to help them implement the framework, including profiling all roles to the SFIA framework, validating with senior leadership, employee skills self-assessment, presenting results and ongoing sustainment and support.

SFIA is constantly evolving to reflect the ever-changing skills needs and landscape of the global tech workforce. SFIA 9 was released in October 2024, providing a more user-friendly storefront with 16 new professional attributes including soft skills and behavioural factors. In the future, ACS has a vision to **map every job role to the SFIA framework and enable matching of skills to suitable roles through AI**, as we move increasingly to a skills-based future-state economy.

> SFIA is not just about assessing digital skills for tech businesses — the SFIA framework can be applied across the whole organisation. We are helping organisations to build **future-ready workforces** by assessing and training today for the skills of the future, as technology impacts on all walks of life.
>
> **Lisa Syrek** Workforce Development Manager, ACS

Stages in implementation of the SFIA framework

- Profiling roles to the SFIA framework
- Validating with senior leadership
- Employee skills self-assessment
- Presentation of results
- Ongoing sustainment and support

Spotlight on digital skills in the public sector

Half of public sector agencies have a critical shortage in digital literacy skills

The digitisation of government services and regulatory activities has created a growing demand for digital skills within the public sector. With a workforce of 4.5 million people in public administration and primarily public industries (health care and education), only a small fraction are technology workers—3% overall.[11] Yet these workers are using digital skills for 35% of their working week on average. Within public administration alone, technology workers make up 9% of the workforce and 49% of working hours, highlighting a concentrated demand for tech expertise in these roles.[13]

When it comes to digital skills, our workforce survey finds that workers in the public sector **are more likely to report their digital skills are insufficient for their current role in all 13 skill areas examined in our digital skills stocktake when compared with other private sector industries.[14]**

The most common inadequate digital skills areas for public sector workers include **virtual reality and augmented reality (53% in roles that were required), AI and machine learning (51%), and robotic process automation (46%)**. One of the largest areas of skills deficiencies in the public sector relative to the public sector is in software development and engineering. Public sector workers were 50% more likely to report their skills were inadequate in this area compared to private sector workers (38% compared to 25%).

These skills gaps in the public sector are likely to persist. **Public sector workers are twice as likely to be not planning to undertake any activities to develop or maintain their digital skills in the next 1 to 2 years (31% of tech workers employed by the public sector compared to 14% employed across other industries).** A similar gap exists when it comes to addressing digital skills in the broader workforce when employed in the public sector compared to other industries.

The skills gaps are damaging the digital capabilities of the public sector. A survey of public sector agencies indicates **half of public sector agencies identify general digital literacy skills as being in critical shortage, demonstrating the need for a whole of workforce approach to refreshing digital skills.[15]** Furthermore, the same survey finds nearly 3 in 4 public sector agencies are experiencing cybersecurity skills shortages, which may risk system vulnerability for affected organisations (Figure 2.3).

These digital skills gaps may be in part related to the risk adverse approach to adopting innovative technologies and the required governance approach for public sector entities. A Nous Group analysis of AI transparency statements of Commonwealth entities found that only 22% of entities were identified as leaders or integrators in their use of AI. A further 34% implemented AI in niche functions of their organisation, while the rest were considered in the observation or experimental phases of AI adoption.[16] These factors may contribute to the gap in AI skills among public sector workers. This may be a result of large legacy systems in the public sector that are difficult to update to be compatible with new tech solutions, with 71% of Australian Government entities indicating a reliance on legacy technology.[17]

The public sector's cautious approach to AI integration is understandable given the sensitive nature of the data involved and the privacy concerns that accompany it. Bureaucratic processes also further complicate the situation by imposing lengthy approval procedures and compliance checks. Consequently, this inertia impacts the development of digital skills, as opportunities for training and exposure to advanced technologies are limited.

To overcome these hurdles, public sector organisations must balance innovation with caution, implementing AI and other emerging technologies responsibly while fostering a culture that encourages digital literacy and adaptability. While the public sector has understandably focused on rules and regulations surrounding AI use to date, there is an opportunity to encourage adoption and experimentation with AI solutions both in the public and private sector.

Despite these challenges, there are indications that the Australia Government intends to lean in on tech. The incumbent government has backed the creation of independent strategic advisory bodies like the Tech Policy Design Institute and has signalled the importance of investing in AI adoption.[18, 19]

Figure 2.3: Digital skills most in critical shortage in the public sector

Cybersecurity specialist
(73% of organisations affected)

General digital literacy
(49% of organisations affected)

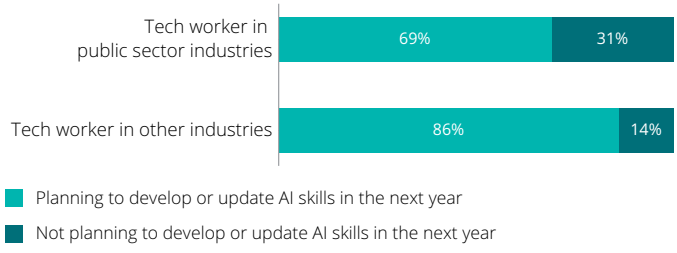
Enterprise/Technology architect
(49% of organisations affected)

ICT/Digital project management
(45% of organisations affected)

IT systems architect
(42% of organisations affected)

Source: Australian Public Service Commission (2024)

Chart 2.4: Intent to upskill in AI among workers from different industries



Source: Deloitte Access Economics workforce survey (2025)

Addressing digital skills gaps would increase the ROI from tech

Improving digital skills represents a potential $25 billion economic benefit for Australia by 2035

The importance of businesses adopting digital technologies to remain competitive and drive long-term economic prosperity has long been recognised by economic institutions such as the Productivity Commission and more recently by the Australian Government.[20, 21]

Having a workforce with the required skills to leverage technology is a critical component to realising the dividend for businesses and the economy. **International research finds that organisations experiencing a relatively lower skills shortage among their employees realise a productivity benefit 30% larger when using new technologies compared to those with a higher degree of skill shortages.[22]**

Modelling undertaken for this report underscores the substantial economic impact of closing the digital skills gap, estimating an additional $25 billion in economic activity could be added to the Australian economy by 2035.[23] Chart 2.5 shows the annual productivity dividend that is expected to come from technology adoption over the next decade and the additional uplift in economic activity associated with improving digital skills across the Australian workforce.

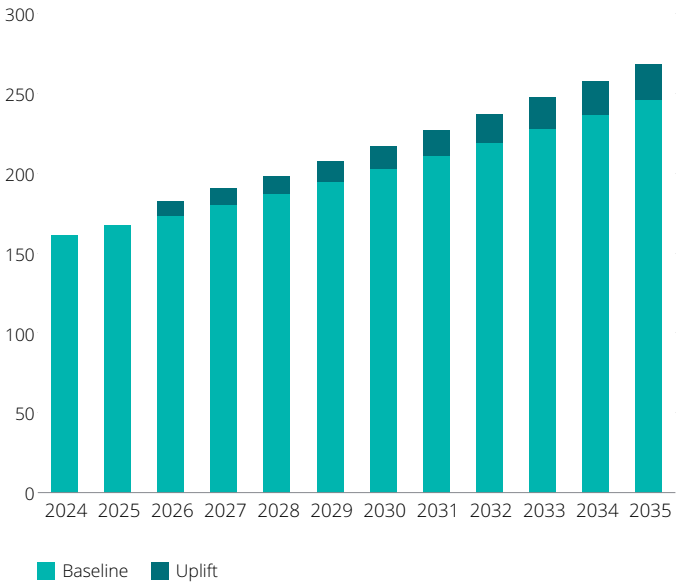
This projection is grounded in the scenario where all Australian businesses achieve skills parity with the top quartile of organisations who currently exhibit the smallest digital skills gaps. This highlights the critical importance of strategic investment in digital skills training and development across industries.

Improving digital skills in the workforce could lead to additional economic benefits as businesses integrate more advanced technologies. **Notably, our C-suite survey found that one of the most common barriers to adopting new technologies is the lack of skilled candidates.[24]** Research by the Technology Council of Australia finds that **if Australian businesses matched the technology adoption maturity of businesses in the European Union, Australian tech investment would rise from 2.2% ($79 billion) to 2.6% ($93 billion) of GDP by 2035.**[25]

Australian C-suite leaders surveyed for this report reinforce the importance of having sufficient digital skills. Nearly half (48%) believe having a more skilled workforce **would increase productivity and efficiency**, lead to a greater ability to adopt emerging technologies (40%), and improve decision making through the use of data (28%) (Chart 2.6). The benefits are near universal across business, with **98% of C-suite leaders identifying at least one benefit from a more skilled technology workforce**.

Realising the $25 billion benefit requires addressing the digital skills gaps right across the Australian economy, from entry-level roles to C-suite executives. Addressing this challenge will require us to think differently about the pathways we use to source technology talent and how we upskill all workers across the economy.

Chart 2.5: Economic impact of more skilled technology use, $ billion



Source: Deloitte Access Economics (2025)

Chart 2.6: The main benefits of having a more skilled technology workforce according to C-suite leaders

Source: Deloitte Access Economics leadership survey (2025)

Case study: Developing skills needed for the digital workforce at TAFE Queensland

TAFE Queensland's technology courses equip students with job-ready skills and industry experience

With more than 200 graduates last year, TAFE Queensland's technology courses are growing in popularity. Students are gaining in-demand skills across a range of technology areas, from cloud engineering to cybersecurity.

Cristey Gudgeon, the IT Discipline Group Manager, and Jackie French, Digital Design Director, explain that students are turning to TAFE Queensland's technology courses for their flexible learning options, access to industry connections, and innovative curriculum. Jackie emphasises that the value of a TAFE Queensland qualification lies in the industry connections it creates. Students gain industry exposure from the start of their qualifications through traineeships, internships, guest lectures, or the annual industry panel events.

To stay ahead in a rapidly evolving industry and ensure students are set up for success, TAFE Queensland proactively engages with industry professionals and associations to keep informed of the latest trends. This industry engagement has shaped course design and delivery, including the integration of cloud computing into the Diploma of Information Technology (Networking). The teaching team is also planning to expand their course offerings in the next few years by introducing AI and robotics, and launching a Master's program in response to industry demand.

TAFE Queensland is tailoring its course delivery to cater to people looking to reskill or upskill midway through their careers. Cristey explains how this has involved the development of shorter, more targeted courses, including micro-credentials, to appeal to people in the later stages of their career. Students now have the option of enrolling in a part-time diploma program taught after business hours to accommodate busy schedules. The offering has seen strong uptake, with a committed cohort studying an accelerated curriculum designed to quickly advance existing digital skills.

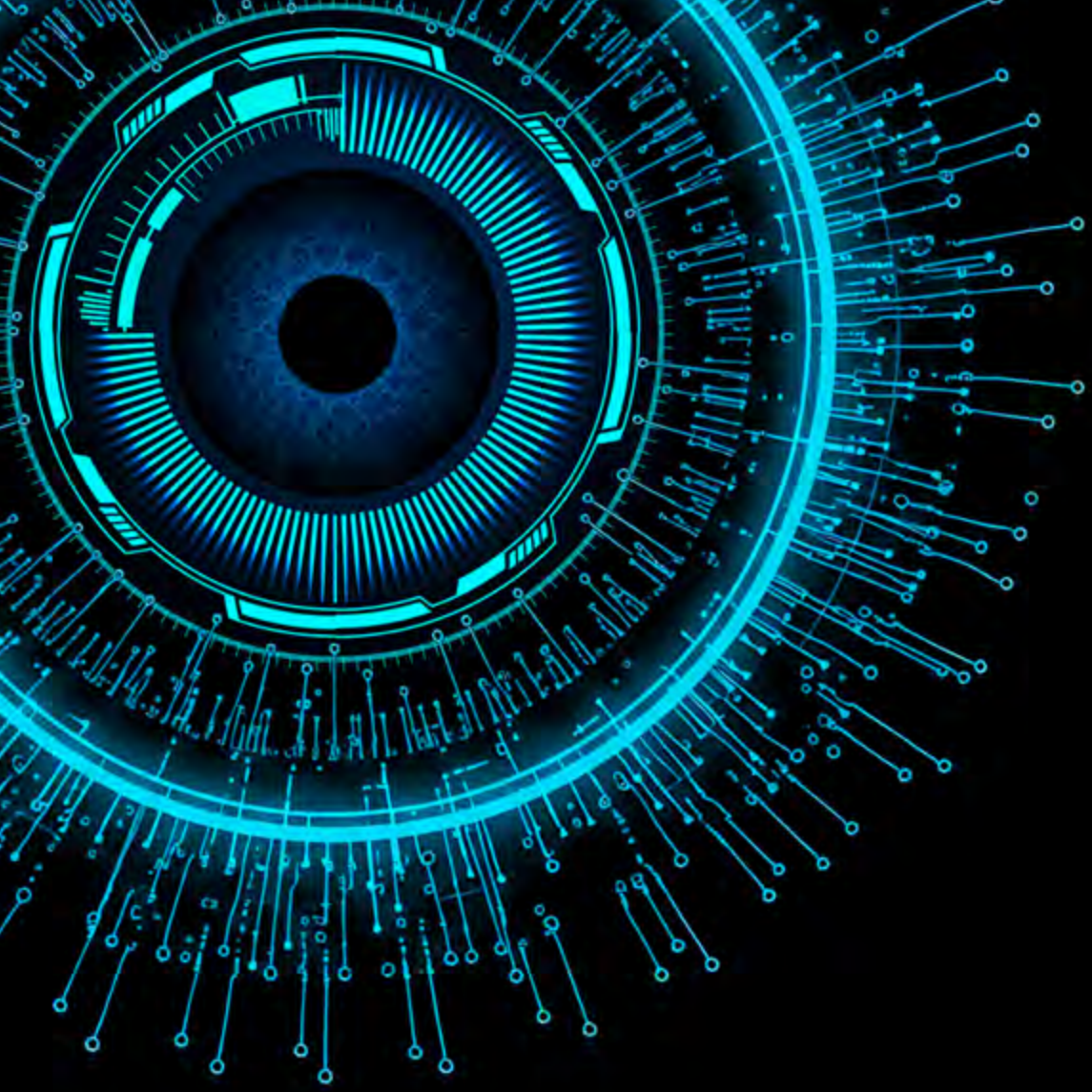
TAFE Queensland is also committed to fostering diversity in the technology talent pipeline. A transition towards online learning has enabled a more diverse cohort of students, particularly from regional areas, to access tech courses. Over the past two years, TAFE Queensland has been running a First Nations traineeship, with 11 students gaining work experience at Queensland Health.

Employers are increasingly recognising the need to build digital capability in their workforce through the vocational education system. For example, the Queensland Government has partnered with TAFE Queensland to deliver a Cyber Skills Accelerator Program to strengthen the cyber capabilities of the public sector. With growing digital skill needs in both public and private sector organisations, TAFE Queensland will continue to play a key role in developing new tech talent.

> "The old education model that prepares students for a single, long-term career path doesn't work anymore, my classroom is full of 20 to 35 years olds who are making deliberate choices to move into IT.
>
> **Cristey Gudgeon**
> IT Discipline Group Manager, TAFE Queensland

Delivering leading edge courses

- **Proactively engaging with industry bodies to keep up to date with the latest advances in the tech industry**
- **Providing traineeship and internship opportunities so students can gain work experience**
- **Updating the curriculum to include cloud computing, AI and robotics**
- **Offering online and night classes to cater to diverse needs**



3 | AI skills deep dive

The accelerating AI revolution

55% of businesses to be using or trialling agentic AI in two years

The race between business leaders to rapidly integrate AI solutions into operations is transforming the business landscape as the technology is used to automate complex tasks and foster innovation. **Our survey of C-suite leaders suggests that 29% of businesses are using already using generative AI solutions at work (Chart 3.1).**[1] The anticipated fivefold increase in AI investment by Australian businesses from 2022 to 2030 reflects the growing reliance on AI technologies.[2]

The recent emergence of agentic AI has once again captured the imaginations of business leaders and technologists. The capacity of agentic AI to autonomously plan, coordinate and execute complex tasks have opened up a range of previously unfeasible uses.[3] The interest in agentic AI is expected to build on the already significant focus by business leaders on integrating generative AI solutions into their companies, leading to even more rapid adoption across businesses.

For instance, hipages, an online platform that allows customers to connect with tradesmen, is now leveraging Salesforce's Agentforce platform to speed up the onboarding process for new contractors. The process now happens within a few minutes compared to several hours, enabling contractors to be available for work sooner.[4] Agentic AI is also being used in the health care sector to support practitioners with diagnostics, treatment planning, and patient monitoring. One recently developed health care agent orchestrator product is seeking to coordinate a group of multi-specialty oncologists to review tumours and determine treatments for patients.[5]

Global and Australian markets are responding to agentic AI's potential with the global market for agentic AI expected to reach $317 billion by 2034, up from $130 million in 2024. This represents an annual average increase in value of approximately 44% over the next decade.[6]

This will also translate into greater use of agentic AI within Australian businesses. When surveyed, three-in-five (60%) of C-suite leaders indicated they would be trialing or using either generative or agentic AI in less than two years.[7] In, fact 55% expected to be trialling agentic AI within that same period.

The scale of disruption should not be underestimated. The 2023 edition of ACS Australia's Digital Pulse estimated that 86% of occupations across the economy would be affected by AI technologies, and 25% of all working hours across the economy would be impacted.[8] The growing capabilities of new AI solutions suggest that this figure could be even higher.

To harness AI's benefits, businesses must ensure their workforce is equipped with the necessary skills, embracing digital transformation and agile business models. This involves reimagining workflows to integrate AI effectively, fostering a culture of continuous learning, and adapting organisational structures to remain competitive in an AI-driven economy.

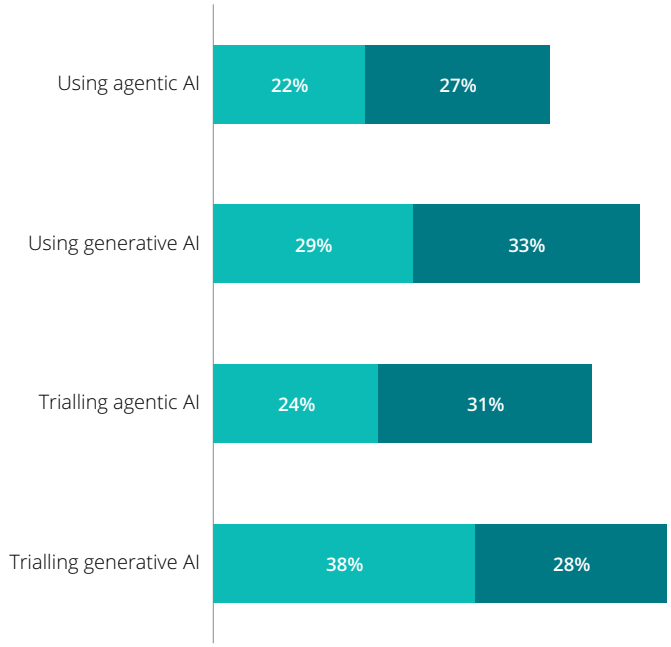
Figure 3.1: The growing importance of AI

60% of businesses expect to be using agentic AI within the next two years

The global market for agentic AI is expected to reach $317 billion by 2034

Source: Deloitte Access Economics (2025)

Chart 3.1: C-Suite leaders trialling or using AI tools in their businesses within the next two years



Source: Deloitte Access Economics leadership survey (2025)

Building the skills required for the AI revolution

Tech upskilling and strong AI governance are essential for embracing agentic AI

Developing AI skills in the workforce is crucial for leveraging AI's potential and mitigating associated risks. Our workforce survey found a significant gap, with 60% of the Australian workforce feeling they are inadequately skilled in using AI for data analysis, a more pronounced deficit than the 40% of workers reporting they have insufficient skills to use digital dashboards.[9]

Workers are recognising the need for upskilling, with more than two-thirds planning to develop AI skills over the next 12 months (Chart 3.2). Key skills sought include data analytics (28%), critical thinking regarding AI outputs (24%), and AI ethics (24%).

These competencies are vital for effective AI deployment, addressing concerns like security vulnerabilities, privacy issues, and governance challenges. Last year's ACS Australia's Digital Pulse found that more than half (55%) of tech workers believe that their current workplaces do not have the correct settings in place to identify and resolve governance issues related to AI.[10]

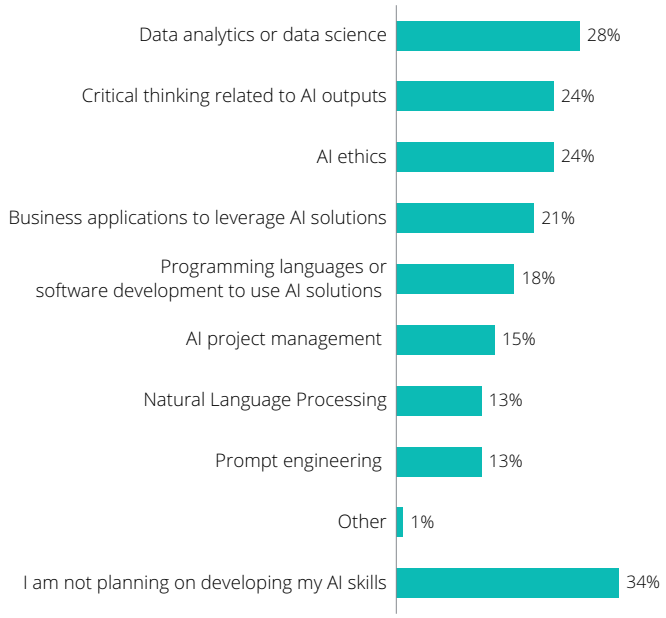
Deloitte's Trustworthy AI Framework identifies people and skills as one of the five pillars of effective AI governance (see Figure 3.2).[11] While there is no one-size-fits-all for AI governance, effective AI governance is required at all stages of the technology life cycle.

Deloitte research released last year found that organisations with higher maturity levels of AI governance according to the Trustworthy AI Framework have:

- higher levels of staff adopting AI
- Deployed AI solutions more widely across different business units such as sales and marketing, operations and legal
- higher revenue growth from AI solutions.[12]

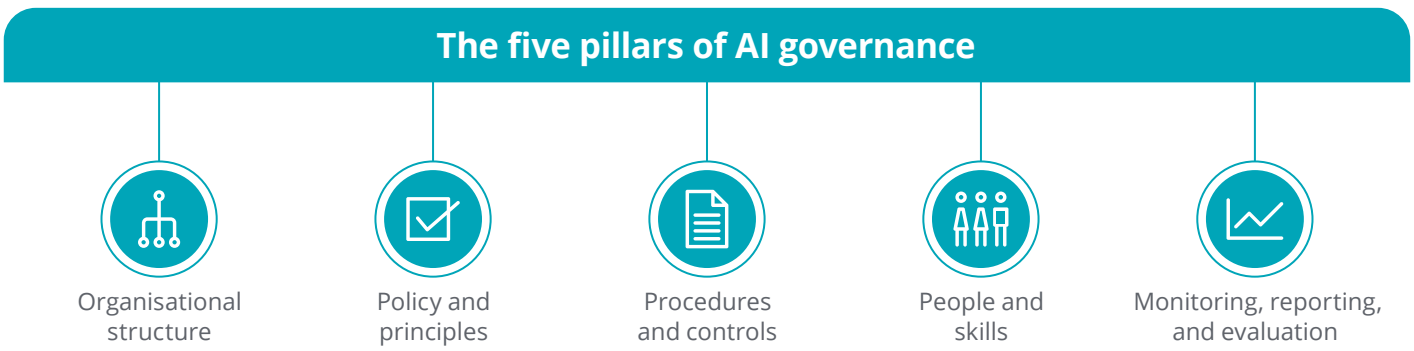
Despite the benefits of effective AI governance, only 56% of employees, on average, have the skills and capabilities to use AI responsibly.[13] Training is pivotal; companies offering AI training see a 27% increase in employees equipped to use AI safely. To bridge the skills gap, businesses should implement comprehensive training programs focused on practical AI applications, ethical considerations, and critical analysis, fostering a workforce capable of using AI effectively and responsibly.

Chart 3.2: Specific AI skills to be developed over the next 12 months



Source: Deloitte Access Economics workforce survey (2025)

Figure 3.2: Pillars of AI governance



Source: Deloitte Access Economics workforce survey (2025)

Innovation in AI will shift Australia's position in the AI value chain

Australia needs more innovative startups and entrepreneurial approaches to the development and use of AI

Australia is currently more of a user and adopter of AI technologies than a major developer of AI models. This is supported by Deloitte research which found Australian businesses are lagging when compared to 12 other markets in the Asia Pacific. In fact, only 15% of Australian workers indicated that they thought their business was an innovator or early adopter of AI—ranking Australia in 12th place.[14]

The Productivity Commission suggests that Australia's comparative advantage in the AI value chain will lie in its ability to develop AI models that can be trained on smaller and high-quality datasets and adapting existing AI models for local markets.[15]

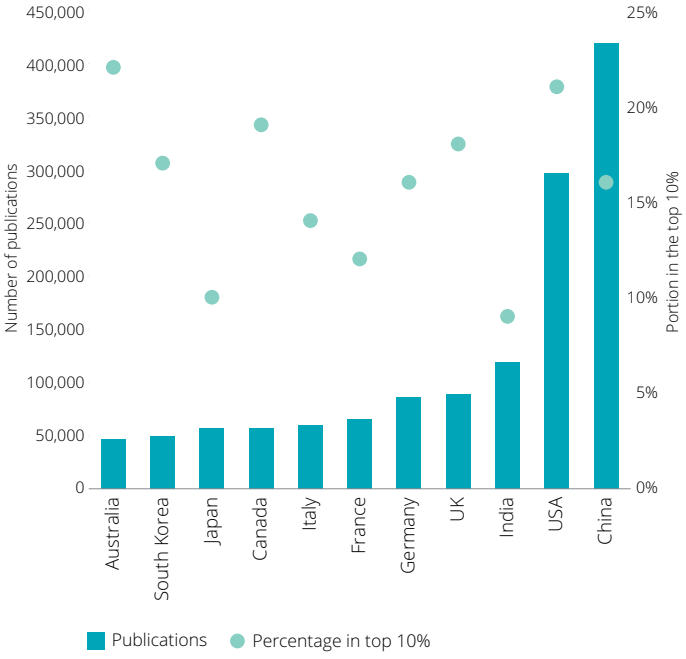
Realising the full opportunity of AI will require an innovative approach to developing solutions and an entrepreneurial mindset. Australia already has some successful AI startups. For example, Relevance AI, an AI agent startup, is an example of recent domestic success, raising $24 million in its latest fundraising round.[16] Relevance AI provides a platform for businesses to build tailored AI workforces to meet their specific requirements. Instead of relying on compartmentalised AI systems, Relevance AI helps customers build AI teams that work together and automate tasks across the organisation.

With more than 70% of startups relying on AI for specific team functions, the ability to create an AI workforce will be invaluable in the early phases of new ventures. This will alter the composition of startup teams, allowing for more individual entrepreneurs to start their business as they are able to automate processes. Approximately one-quarter of founders are using AI to perform job functions across content creation, software development, and marketing.[17]

Despite some success stories, Australia is lagging in terms of systemically producing AI innovation. Australian research organisations and universities contribute significantly to world-leading AI research.[18] In 2023, Australia generated 1.6% of the world's AI-based research publications, yet 22% of Australia's AI research is in the top 10% of publications worldwide (Chart 3.3).[19] Despite producing world-leading research on the subject, only 0.24% of AI-related patents were filed in Australia, with the majority of those filed in Australia coming from applicants based overseas.[20] China and the United States dominate AI patents and research globally (Chart 3.4).

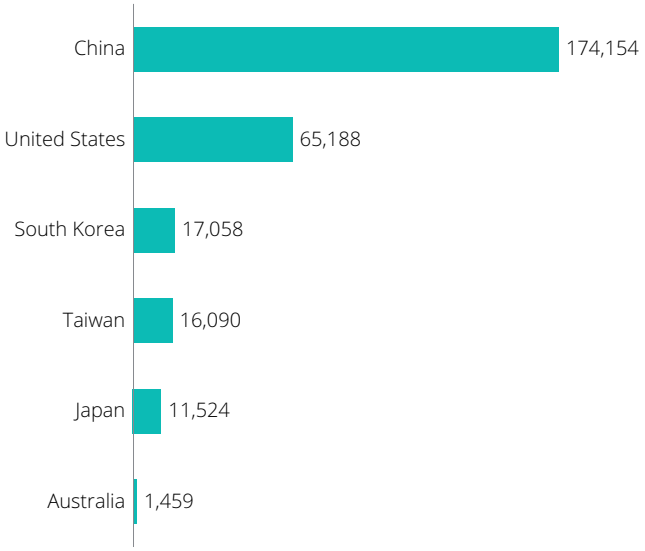
There is a significant opportunity for Australia to harness the full potential of this research through collaboration and driving innovation and entrepreneurism within Australia. This is not pertinent to only AI-related technologies and adoption. Broader commercialisation, innovation, and entrepreneurism can unlock significant productivity gains for Australia. To achieve this, Australia's innovation ecosystem needs to transform. This subject is more fully explored in the final chapter of this report.

Chart 3.3: AI publications and global research rankings by jurisdiction, 2018 - 2022



Source: Department of Industry, Science and Resources (2023)

Chart 3.4: Number of AI patents filed by jurisdiction, 2017-2024



Source: Department of Industry, Science and Resources (2023)

Case study: Driving trust through skills development at ISACA

ISACA Melbourne Chapter's commitment to ongoing skills advancement and certification

ISACA is a global professional association and certification body dedicated to digital governance and developing information systems, knowledges and practices. Natalie Hingco Perez, Professional Development Director, and Bharat Bajaj, Certifications Director of ISACA's Melbourne Chapter discuss the importance of building digital capabilities and making technology accessible across the Australian workforce.

Since its inception, the role and purpose of ISACA has evolved significantly from focusing on technology auditing to providing a wide range of trusted certification programs applicable across the workforce. Natalie explains the value of certifications as validating industry expertise and instilling confidence and trust in businesses seeking to build technology talent. Natalie points out that "Technology is an enabler and driver of strategic growth, but it cannot transform organisations without empowering people with the right skills."

In a rapidly changing digital landscape, ensuring professionals remain equipped with current skills is crucial. Bharat explains, "We prepare the workforce for the future by providing them with training and uplifting their capabilities." ISACA has responded to evolving digital skill needs through specialised AI certifications and updating its body of knowledge every three to five years to align with industry trends and requirements.

Australian businesses are currently facing significant barriers in engaging with digital skills development. Key challenges raised include a lack of government readiness to invest in skill development, arduous visa processes for hiring international talent and a perceived mismatch between digital skills needs and recruitment process requirements: "There is a heightened need for tech skills. Government needs to review the process and if they really believe there is a skills gap, they should provide support to make it easier for businesses to hire internationally." Natalie also calls for further support for small- to medium-sized enterprises to help them quickly adapt to emerging technologies so that businesses of all sizes can harness the potential gains.

Establishing industry partnerships is helping to address tech skills shortages and facilitate knowledge and skills transfers globally. Natalie advises "Through our Emerging Trends Working Group, we bring global industries and organisations together and provide a platform for them to learn and share the best available knowledge." Collaborations with organisations such as ACS, Australian Women in Security Network (AWSN) and universities also aim to promote diversity in tech fields and support the future pipeline of skilled workers, enabling graduates to build skills and professional connections needed to enter and thrive in the tech workforce.

> "AI is one piece of technology, but there are many others on the horizon. Australia has a golden opportunity—we have the people and we are growing the skill sets. We must be proactive in applying people with the right skills to drive research, development and innovation.
>
> **Bharat Bajaj**
> Certifications Director, ISACA Melbourne Chapter

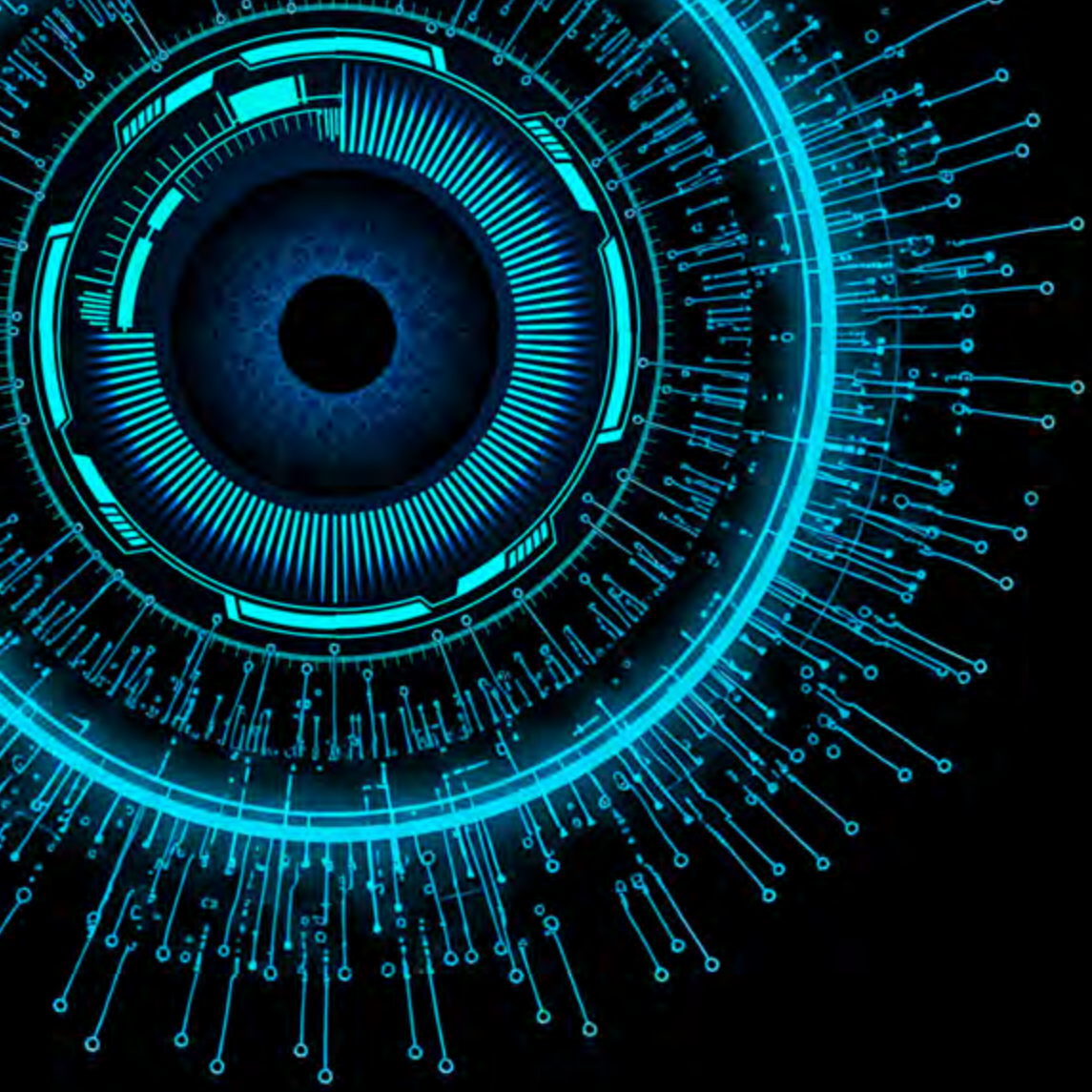
Empowering Digital Australia Together

- **Relevant, up-to-date and trusted certifications for the workforce**
- **Making technology capabilities accessible to all businesses**
- **Promoting diversity and collaboration through industry and university partnerships**

"

Digital skills are scarce, but not rare. We just need to dig more up by promoting alternative learning pathways and entry-level roles where workers can develop job-ready skills. From there we need to think about the skills and experience people need to go from entry-level to more senior roles, and what training looks like to get them there.

Chris Fechner
CEO Digital Transformation Agency



4 Cyber skills deep dive

The growing prevalence and sophistication of cyberattacks

There is one cyberattack every six minutes, but more than 80% of cyberattacks are not reported to authorities

As the digital economy has grown, cyberattacks have transformed from a looming threat to a pervasive reality. In recent years, many businesses with household names have experienced cyberattacks on sensitive and client information that can lead to financial losses, disrupt operations and erode consumer trust.

There are **87,500 cybercrimes reported to the Australian Signals Directorate every year**, representing one every six minutes (Chart 4.1).[1] The true number is likely up to 4.5 times higher due to most cybercrimes going unreported to police.[2]

Our worker survey found that tech workers are more than twice as likely to experience cyberattacks, with 62% experiencing at least one attack in the past year compared to 28% for workers employed in other industries.[3]

The top five reporting sectors are federal government (37%), state and local government (12%), health care and social assistance (6%), education and training (5%) and professional, scientific and technical services (5%) (Chart 4.2).

The top five reporting sectors are consistent across FY23 and FY24; however health care and social assistance has risen to be the most frequently reported non-government sector.[4]

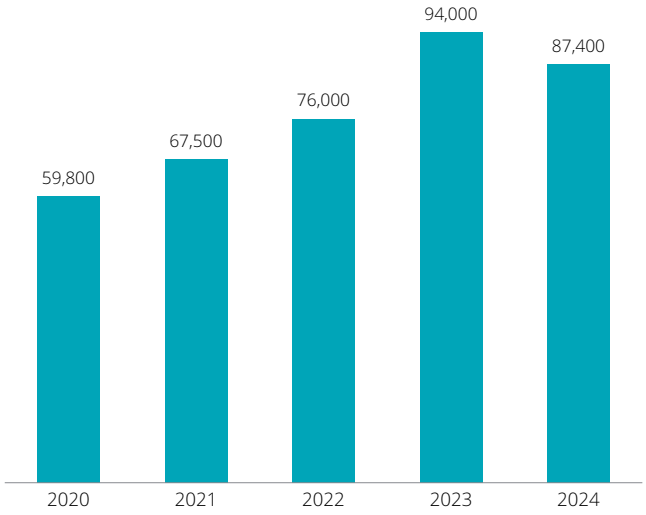
Cyberattacks can take many different forms. The Australian Institute of Criminology has identified the following four types:[5]

- **Online abuse and harassment:** online communication to or about an individual which may cause them emotional distress.
- **Malware:** referring to software specifically developed to harm a computer system or network.
- **Identity crime and misuse:** incidents where a person's personal information is obtained without their permission to carry out a business, or activity or transactions in their name.
- **Fraud and scams:** involve intentionally deceiving someone to obtain money or something of value, e.g., personal information.

The type of cyberattack often varies according to the target. Cyberattacks most commonly affecting government agencies and critical infrastructure operators involved compromised accounts or credentials followed by malware infections. Identify fraud accounted for a quarter of attacks on individuals while compromised accounts was the most common type of cyberattack experienced by businesses.

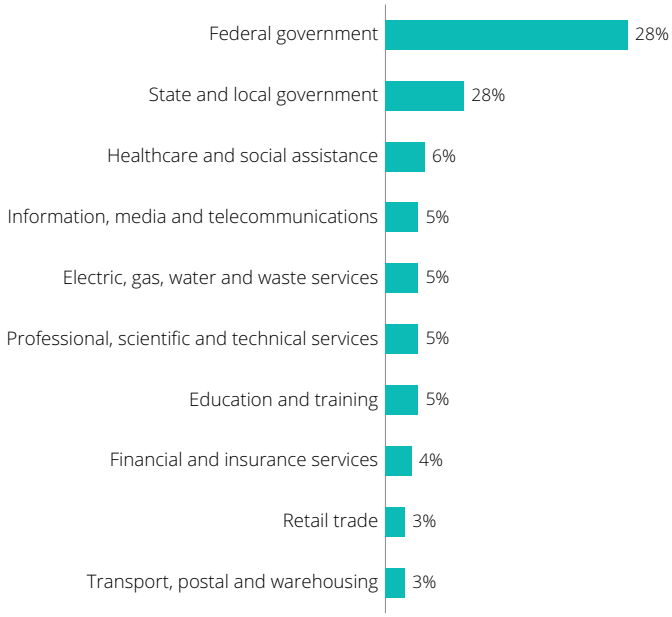
There is a growing potential for cyberattacks to become more common or effective, as advances in AI enable a wider set of actors to automate cyberattacks with increasing sophistication. The number of AI-enabled cyberattacks is already on the rise, having doubled between 2023 and 2024, and is expected to grow even further in 2025.[6]

Chart 4.1: Reported cyberattacks, 2020-2024



Source: Australian Signals Directorate (2024)

Chart 4.2: Top reporting sectors, 2023-2024



Source: Australian Signals Directorate (2024)

Uplifting Australia's cyber capabilities is an opportunity to reduce the $63 billion in annual cyberattacks costs

Cyberattacks impose significant costs at the individual, business and economy-wide level

Cyberattacks result in a wide range of costs including immediate financial losses from theft and fraud, disrupted operations, lower productivity, recovery expenses, and reputational damage. In this edition of ACS Australia's Digital Pulse, we estimated the costs of cyberattacks to individuals, businesses and government using data from the Australian Signals Directorate (ASD), the Australian Institute of Criminology (AIC), the Australian Bureau of Statistics (ABS) and other sources.

Using this approach, **the total cost of cyberattacks to the Australian economy is estimated to be $63.5 billion each year**, including **$58.7 billion** for businesses responding to attacks and **$4.6 billion** for individuals (Figure 4.1). These costs are larger than the size of the Accommodation and Food Services industry in FY23.[7] Uplifting cyber capability to defend against cyberattacks represents a significant opportunity for the Australian economy in avoided costs.

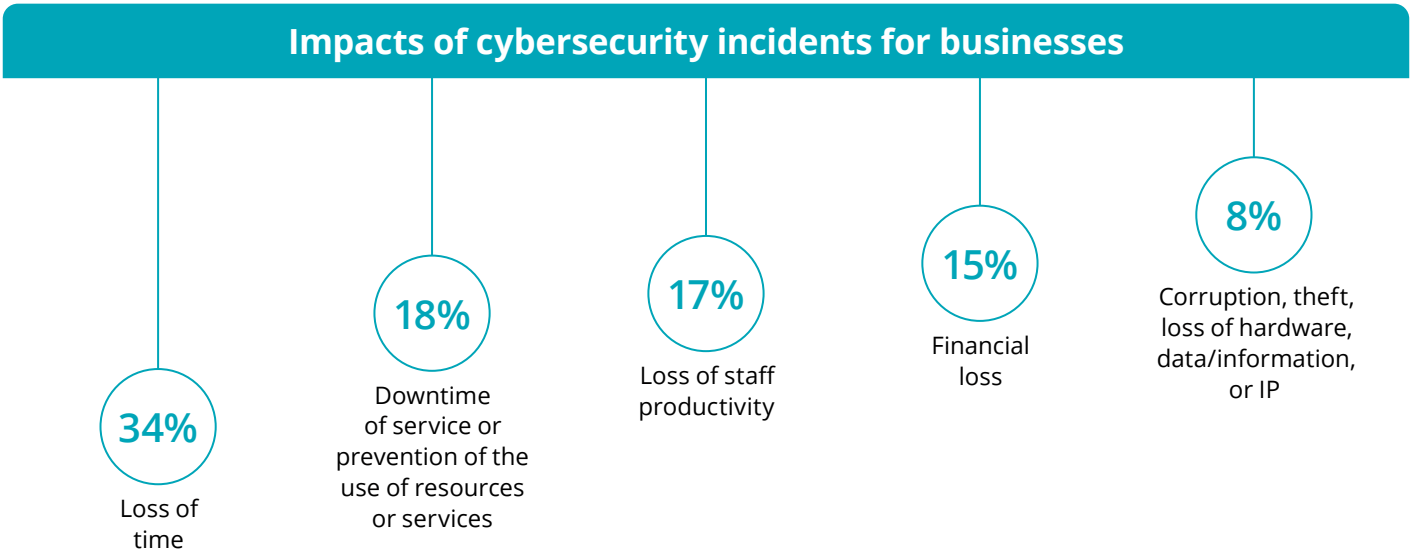
Australian businesses incur the largest share of these costs, with $58.6 billion in costs for FY24. This estimate is based on the average costs of a typical cyberattack for small, medium and large business from ASD.[8] In response, businesses and government organisations have invested in systems to protect sensitive data and systems against these attacks. This figure includes **$6.2 billion** in estimated expenditure on cybersecurity software and products by Australian organisations in 2024.[9] The costs for businesses also includes the cost of employing cybersecurity professionals, estimated at **$16.5 billion** based on the 137,500 cybersecurity professionals employed in Australia in 2024.[10,11]

Individuals also face significant costs associated with cyberattacks, with the average cyberattack costing $987 in FY24.[12] Aggregating to account for the **1.16 million** cyberattacks on individuals per year suggests the **cost to individuals is $4.6 billion per year**.

Figure 4.1: The annual cost of cyberattacks to the Australian economy

Source: Deloitte Access Economics calculations (2025)

Chart 4.3: Impacts of cybersecurity incidents for businesses, 2022 (%)



Source: ABS (2022)

Boosting skills to uplift Australia's cyber defences

Cyberattacks impose significant costs at an individual, business and economy wide level

Mitigating the cost and impact of cyberattacks on the Australian economy will require ensuring the right skills in cybersecurity professionals and the broader workforce alongside the appropriate software and systems.

Cybersecurity skills shortages risk leaving everyday Australians and businesses exposed to increased vulnerabilities and inadequate security protocols. **There were 137,500 cyber professionals employed in Australia in 2024,[13] yet 54,000 additional cybersecurity professionals will be required to meet demand and mitigate the impact of cyberattacks by 2030.** The 54,000 additional cyber professionals include 28,000 core technology workers such as cybersecurity engineers and penetration testers, and 27,000 cyber-dedicated workers such as cyber compliance specialists and chief information officers. In total, 84% of occupations have skills that will be affected by cybersecurity by 2030 and 18% of all worktime will be affected.[14]

The workforce shortage is acute in domains such as **cybersecurity, system design and implementation and information security** as well as **cloud security, cyber threat intelligence** and **malware analysis** (Figure 4.2).[15]

Building the cybersecurity workforce through education programs and incentives to attract talent will be key to addressing this shortfall. Collaborating with educational institutions to integrate cybersecurity into curricula and offering certification programs can help bridge the skills gap.Cyber Security Services, Accreditations & Training (CREST) and ISACA (formerly standing for the Information Systems Audit and Control Association) are two such organisations providing resources and accreditation services to uplift capability across the cybersecurity profession globally and Australia.

It is increasingly **important for workers across all industries to understand, identify and report cybersecurity risks**. Fostering a culture of cybersecurity awareness and resilience within organisations is crucial. **Almost one-third of non-tech workers report low confidence levels** when it comes to recognising and appropriately responding to cyber threats (27%) Confidence levels are lower among women, with 18% of women selecting not confident or unsure compared to 11% for men (Chart 4.4).[16]

As cyberattacks become more sophisticated, so too must Australia's defences. Cybersecurity will be increasingly critical as technology risks evolve and become more sophisticated, particularly with the rise of AI-enabled attacks that use algorithms to automate and accelerate malicious activities. This growing threat may also drive greater demand for entry-level cyber roles.

While developments in AI may increase exposure to cyberattacks, they also offer potential solutions such as improved identity verification and user access management. It will be important for organisations to have appropriate and responsive systems to detect and respond to growing cyber threats.

AI may also lower technical skills barriers, making it easier for people with existing expertise in risk and compliance to transition into a cyber role. This would not only help meet the number of cyber professionals needed but increase the diversity of talent pool.

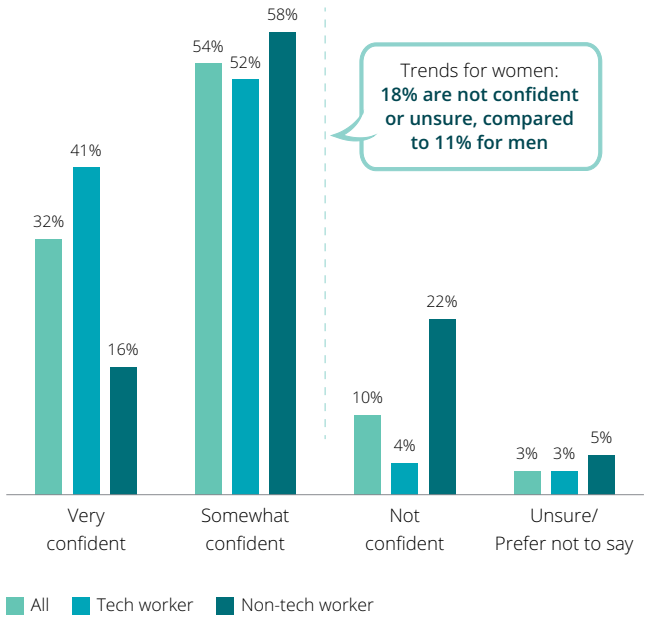
Collaboration with government initiatives, such as the Australian Cyber Security Centre (ACSC), can strengthen preparedness among organisations and improve response strategies. A collective effort is required to create a culture in which workers across the economy are educated on cybersecurity risks and feel empowered to recognise and respond to threats as they emerge.

Figure 4.2: Top skills sets demanded for cybersecurity by 2030

Cybersecurity 18,800+	**Network configuration** 4,900+
Systems design and implementation 5,600+	**General networking** 4,700+
Information security 5,100+	**Cloud solutions** 4,700+

Source: Australia's Digital Pulse (2023), World Economic Forum (2024)

Chart 4.4: Confidence in responding to cyber threats



Source: Deloitte workforce survey (2025)

Case study: CREST building capability and quality assurance of cybersecurity services

Creating a trusted cybersecurity profession

CREST is a global not-for-profit membership body for cybersecurity businesses and professionals. CREST is helping to build capability across the industry, with 444 accredited service providers across Australasia, the UK, Europe, Asia, and the Americas, and more than 3,000 individuals holding CREST certifications worldwide. Nigel Phair, CREST's Director for Asia Pacific, shares his insights on the evolving cybersecurity landscape.

Nigel explains the role of CREST in **building capability and competence for the global cyber market** by providing accreditation, assessment, and professional development that enhances the performance of individuals and organisations. All Accredited Members undergo rigorous assessment processes and are listed on a searchable supplier directory, connecting those seeking services with competent and capable providers. Through its accreditation process, CREST assesses a service provider's ability to deliver consistent, high-quality cybersecurity services. "We're constantly evolving our accreditations and certifications to meet the changing needs of buyers and to adapt to technological advancements," Nigel adds.

Accreditation and certification play a crucial role in **building customer trust**. For businesses investing in cybersecurity services, having a provider assessed by independent industry experts offers assurance around the quality of services delivered. Accreditation also enables cybersecurity providers to join a globally recognised community, offering access to shared expertise, and professional development opportunities. CREST's position at the intersection of industry, government, and regulators facilitates collaboration, influences best practice, and raises standards across the cybersecurity ecosystem.

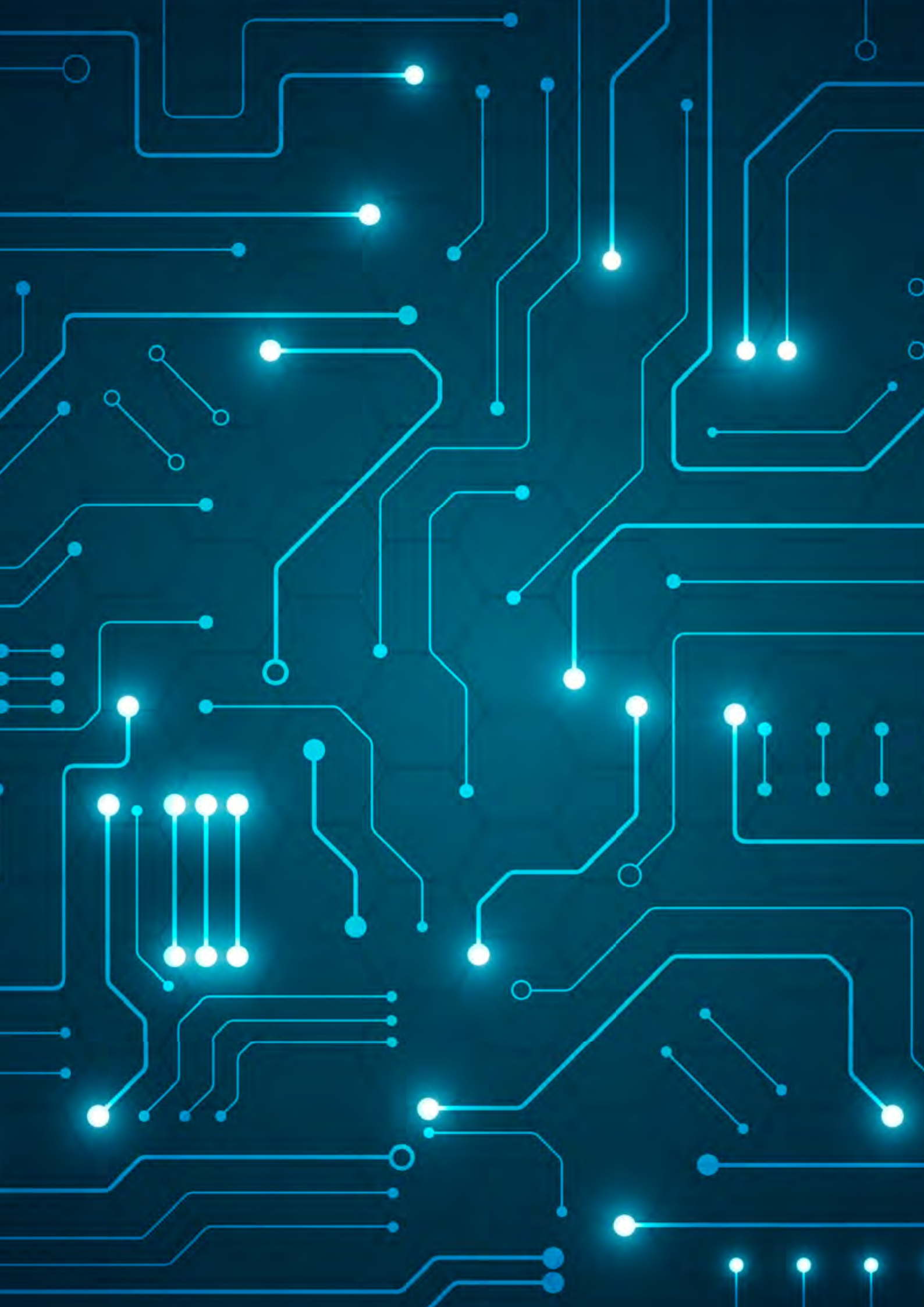
CREST aims to **strengthen the global cybersecurity skills pipeline** by developing training materials delivered through registered training providers, as well as delivering capability and capacity-building initiatives for cybersecurity practitioners across Asia, Africa, Europe and the Middle East. A key opportunity to strengthen the cybersecurity workforce lies in **expanding entry-level roles**. While the sector benefits from professionals transitioning into cybersecurity from other fields, there is a clear need for more structured pathways for early professionals. Nigel explains "Unlike professions such as law or accounting, there are relatively few opportunities for school or university leavers to enter cybersecurity directly."

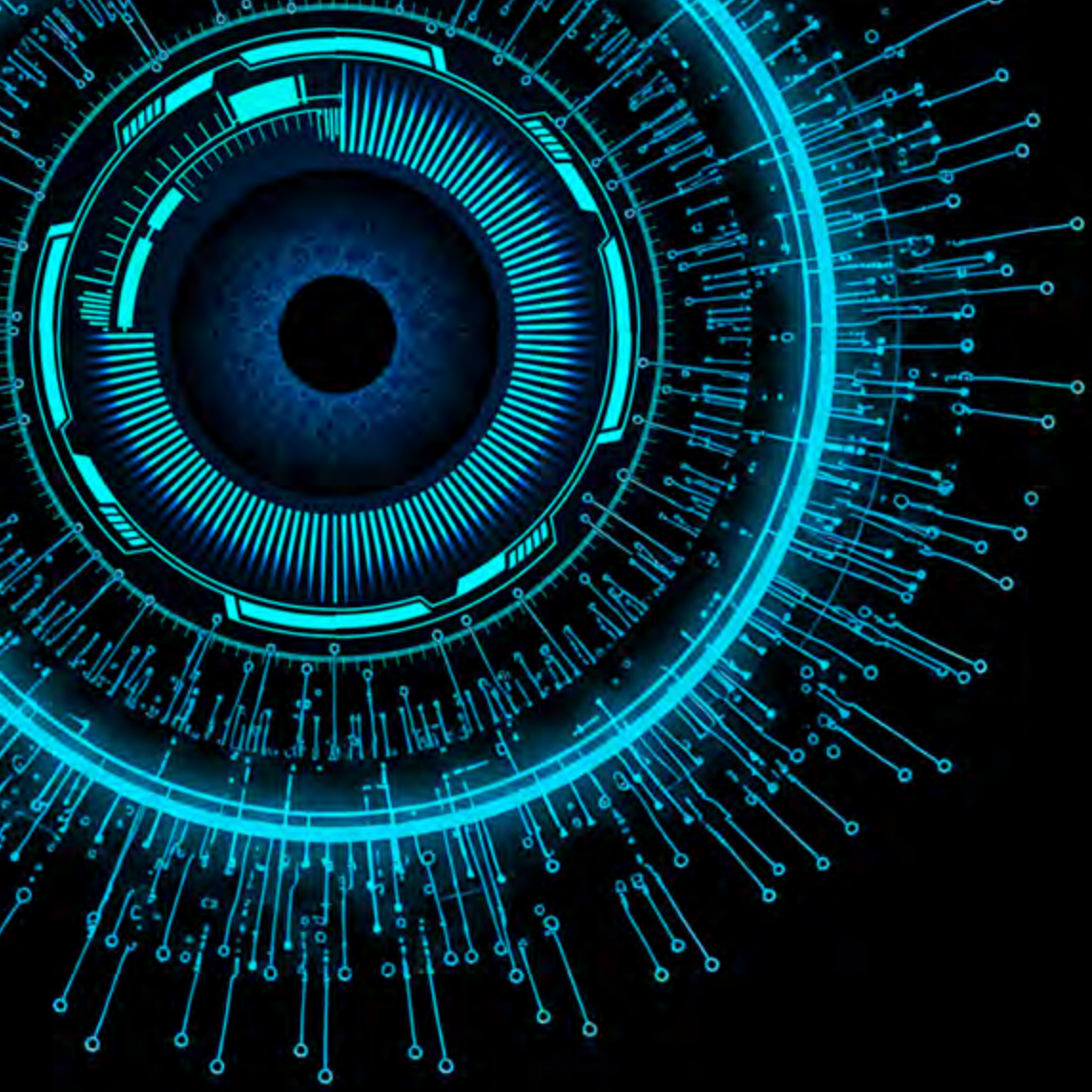
Educating stakeholders on cybersecurity risks is another major focus for CREST, including facilitating global conferences and engaging directly with national governments. Nigel highlights the need for further action from both businesses and government to strengthen Australia's cybersecurity defences. "Businesses need to understand the value of their online assets and take basic steps to protect them." He notes "Australia has a strong set of compliance levers and reporting obligations in legislation, but they are only effective if they are enforced. We must ensure businesses are held accountable for breaches to drive meaningful improvements in cybersecurity resilience."

> "We really need to drive the case for trustworthiness. Most organisations don't understand the scale of cybersecurity risks, the value of their online assets or the return on investment of properly defending them.
>
> **Nigel Phair** CREST Director for Asia Pacific

CREST breakdown of accreditations

Category	Global total	Australasia total
Total CREST Member Companies*	**444**	**68**
Penetration Testing	415	65
Vulnerability Assessment	82	9
Red Teaming (STAR ILPT)	31	9
Incident Response	77	14
Threat Intelligence (STAR TI)	8	6
Security Operations Centres	67	8





5 Refreshing our approach to digital skills

Australia's traditional sources of tech talent are coming under increased pressure

Employers need to explore new ways to approach digital skills

Australia's workforce is at a pivotal juncture, with an increasing need to build our digital skills. Yet the common sources of digital talent now appear to be operating as well as they have in the past.

Australia's core technology workforce has been heavily reliant on international talent to fill digital skills gaps. In fact, nearly half of technology workers employed in Australia were born overseas, underscoring the critical role that skilled migration plays in bolstering the sector.[1] Recognising this dependence, the Australian government has expanded the Core Skills Occupation List (CSOL) to include more technology-specific roles such as penetration testers and DevOps engineers.[2]

However, recent trends indicate a growing challenge in sustaining this inbound flow of international talent. **ABS data reveal a decline in net migration from a peak of 536,000 in FY23 to 446,000 in FY24, driven partially by a 10% reduction in migrant arrivals.** Government projections suggest net migration will decrease further to 225,000 by FY28.[3] With fewer skilled migrants entering, the pressure mounts to develop domestic capabilities and plan alternative routes to build talent such as through employer sponsorship or reskilling existing works within organisations.[4]

The university system has historically been seen as a cornerstone of developing technology talent. Interest in IT degrees remains steady, with a 5% increase in enrolments in 2023 to reach 14,800 undergraduate and 5,000 postgraduate enrolments.[5] **Yet this pipeline is also highly reliant on international students who made up 71% of enrolments, which may be more difficult to maintain in coming years.** Meanwhile, there was significant growth in the number of completed IT undergraduate degrees, which rose by 11% to reach 6,100 while there were 3,500 completed postgraduate degrees.

Despite rising enrolment numbers, significant concerns have been raised regarding the job readiness of graduates. National employer surveys have noted increasing dissatisfaction with the technical skills of university graduates, with only 1% of employers in 2024 perceiving graduates as 'job ready' for the workplace – a drop from 3% in 2023.[6] Furthermore, 65% of employers report needing to reskill graduates, highlighting a disconnect between academic training and industry requirements.

At the same time, university student satisfaction levels are also dwindling. According to the 2023 QILT Employer Satisfaction Survey, less than half of IT graduates believed their qualification was important for their current employment, the lowest across all education fields.[7]

Australia's schools play a crucial role in laying the groundwork for digital literacy and skills. **Yet 40% of current workers feel their school education did not adequately equip them with the digital skills necessary for success in today's workforce.[8]** Evidence also suggests that only one in ten school students have an interest in pursuing a tech career, which has not changed in recent years.[9]

In 2022, the National Assessment Program in ICT Literary (NAP-ICTL) showed that 46% of year 10 students were proficient in ICT technologies, the lowest percentage since 2005.[10]

The gap in school-based ICT outcomes highlights the importance of better integrating comprehensive digital skills development into school age education. By focusing on digital literacy, coding, and critical thinking from a young age, schools can better prepare students for further education and careers that require digital skills at their foundation. This could further be reinforced by adding ICT skills into the National Assessment Program – Literacy and Numeracy (NAPLAN) test so that ICT literacy can be assessed for a broader range of students.[11]

Figure 5.1: Traditional sources of technology talent

Declining net migration

While more technology-related roles have been included on the Core Skills Occupation List, Australia's net migration and number of new migrants is declining. For ICT occupations, the number of new temporary work skilled visas (457 and 482) granted fell from 14,000 to 9,000 between 2023 and 2024, and to below pre-Covid levels.

University graduates not job-ready

Tech employers believe the share of 'job ready' IT graduates decreased from 3% in 2023 to 1% in 2024. Notably, only half of IT graduates believed their qualification was important for their current place of employment.

Insufficient digital skills in schools

40% of workers believe their school education did not provide the digital skills required to succeed in the workforce, and fewer than half of year 10 students are currently proficient in ICT technologies.

Source: Deloitte Access Economics using Department of Home Affairs, ABS (2025), Department of Education (2025), QILT survey (2025) and Deloitte Access Economics workforce survey (2025).

VET and industry certificates are trusted paths to develop digital skills

Yet there is a disconnect preferring these pathways and current hiring practices

Australian business leaders are increasingly turning to alternative non-university pathways to cultivate digital skills among employees, as traditional educational routes come under increasing strain. This includes Vocational Education and Training (VET) qualifications, traineeships, micro-credentials, bootcamps, and vendor certifications.

Our survey of C-suite leaders **found that VET qualifications and industry certificates (41%)** are perceived as more effective indicators of tech worker performance than university degrees (34%) (Chart 5.1). Business leaders were also 1.5 times more likely to trust industry certifications over university degrees for developing digital skills.[12]

Students who have completed IT qualifications through VET have also experienced positive outcomes. Most students (80%) are satisfied with the training they received.[13] Consultations with TAFE QLD highlight how integrating traineeships and industry involvement into course design and delivery provides students with highly relevant experience that future employers value.

Industry certificates and micro-credentials are becoming pivotal for reskilling and upskilling, offering flexible, valuable ways to enhance digital skills. Over the past year, 25% of tech workers and 6% of the broader workforce have sought to acquire a micro-credentials to develop their digital skills.[14] The increasing demand for these study options is driving tech companies to expand their offerings.

Despite this preference and positive outcomes from VET and industry certifications, hiring practices lag behind. In fact, 88% of C-suite leaders report their business requires a university degree for tech roles, even though VET qualifications are highly valued.[15] This mismatch is echoed in 2023 research showing that nine out of ten STEM job advertisements require university qualifications, highlighting a disconnect between leadership preferences and recruitment practices.[16]

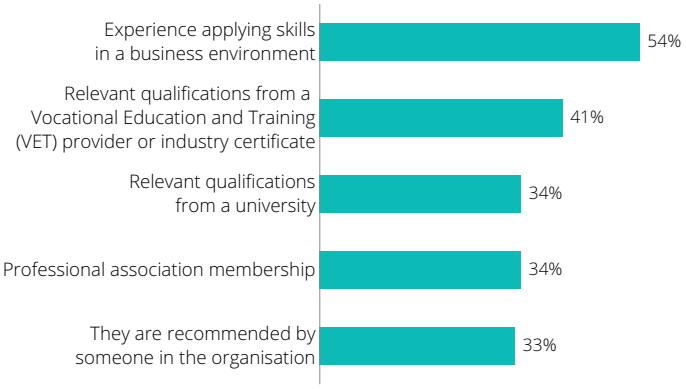
There are opportunities to broaden the entry pathways into digital roles. The NSW Digital Skills and Workforce Compact exemplifies proactive change, with partners pledging that 20% of all entry-level tech hires will come from alternative pathways by 2030. Partners include Microsoft, Amazon Web Services, Salesforce, Accenture, Telstra, Woolworths, NAB, Westpac, ANZ and Commonwealth Bank. Business NSW is also a partner, highlighting the importance of small businesses as part of the Compact's ecosystem.[17]

If adopted nationwide, the 20% alterative pathway pledge could help increase the diversity of the tech sector by raising the proportion of women in a tech role 7 percentage points and doubling First Nations representation in the sector.[18] For individuals, this represents a significant opportunity with research for RMITO finding that women reskilling into tech roles could earn $31,000 more each year.[19] Businesses also benefit from better utilisation of non-university pathways with an estimated $800,00 annual saving from improved retention rates and a 14% increase in worker productivity driven by a more collaborate work culture for medium and large business.[20]

The Australian workforce is responding to signals from employers and government promoting VET education. While enrolments in VET IT courses decreased substantially since 2016 (even before the onset of COVID-19), **the most recent year of data shows an increase of nearly 16,000 enrolments in VET IT courses to reach 64,400 in total for 2023.**[21] The Commonwealth Government's Fee-Free TAFE Skills Agreement is likely contributing to this increase in enrolments by providing funding for 500,000 places across Australia over 2023 to 2026.[22] However, improving the transition from VET enrolments into workforce participation is needed with the completion rate of ICT VET courses sitting at 47% in 2023, inline with the VET-wide average.[23]

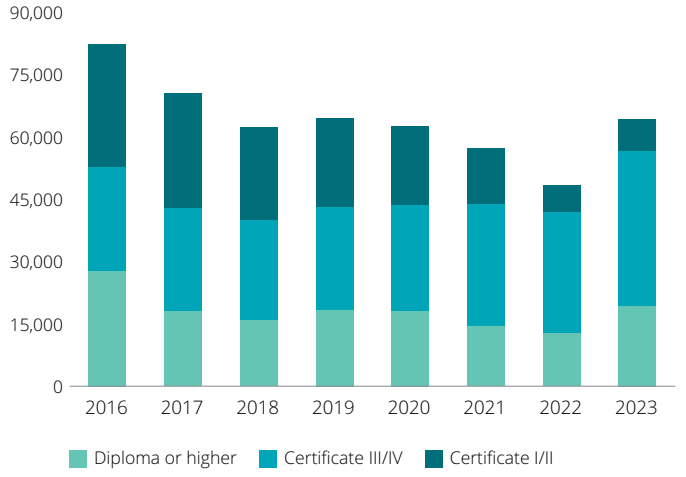
Recognising the importance of digital skills in all roles right across the economy, the Future Skills Organisation (FSO) is actively promoting the integration of digital skills into all VET courses by collaborating with industry and training providers to co-design programs to ensure workers have the required digital skills, regardless of their role or industry.[24]

Chart 5.1: Attributes that indicate tech workers will perform well



Source: Deloitte C-suite survey (2025)

Chart 5.2: VET students enrolled in IT field of education, 2016 to 2023



Source: Deloitte calculations (2024)

Case study: Embracing the evolution of digital skills at Microsoft

Building digital skills of customers, students and the workforce

Tim Allen, AI National Skills Director and Yasminka Nemet, Future Skills Lead discuss the evolving needs of the digital workforce. Building future ready AI skills is a clear priority for major technology employers like Microsoft. Yasminka notes that the increasing capabilities of AI and the more user-friendly interfaces are making all technologies more accessible resulting in the rising demand for skills such as critical thinking, curiosity and creativity and prompting employers to seek workers who can harness technology for productivity, innovation, and growth.

Yasminka explains how Microsoft sees a need to foster a culture of continuous learning among employees, saying "we're encouraged by our CEO Satya Nadella to be 'learn-it-alls,' rather than 'know-it-alls.'" Employees have dedicated learning days and role-specific content to keep pace with the latest tools and skills.

Microsoft is also seeking to lift digital capabilities across the Australian population. "If we focus on education, influencing and participating in new models, the aim is that no one will be left behind. We need to reshape the whole workforce to become AI-enabled," explains Tim. To support this vision, Microsoft launched its National AI Skills Initiative to upskill one million people across Australia and New Zealand in AI literacy.

Microsoft is also a Partner in the NSW Digital Skills and Workforce Compact, which aims to have 20% of all entry-level tech hires coming from alternative pathways by 2030. Tim and Yasminka advocate for the scaling up of non-traditional pathways into tech, noting a step change is needed from tech employers in sourcing talent beyond traditional qualifications.

Yasminka believes attracting workers into tech roles requires de-risking their decision and enabling them to explore a new technology career path through a flexible, incremental learning model. She notes Microsoft's partnership in the co-creation of micro-skills and micro-credential courses at the Institute of Applied Technology Digital has resulted in high enrolment rates. She also highlights the growing role of generative AI as a powerful learning tool that enables continuous upskilling through the flow of work, and to support learning in different contexts.

> "The best shot we have at building future capabilities is through education. As a driver of technologies and adoption, businesses like Microsoft have a responsibility to help the education system to meet the needs of our industry. I don't like to say it's skills for the future anymore – it's skills for the now."
>
> **Yasminka Nemet** Future Skills Lead, Microsoft

Initiatives at Microsoft to develop digital skills

NSW Digital Skills and Workforce Compact is an effort to source 20% of digital entry-level hires from alternative pathways, such as vocational training, vendor courses, and earn-while-you-learn models.[25]

The AI Digital Skills Initiative is Microsoft's response to a perceived critical skills gap and aims to upskill one million people in Australia and New Zealand secure AI skills.[25]

October 2023 commitment is Microsoft's response to a Tech Council of Australia report predicting growth in AI-related jobs. The commitment seeks to help train 300,000 Australians with digital skills within two years.[26]

Generation Australia partnership is a collaboration between corporations and the training provider Generation Australia to support people in the tech sector, including Web Development and Cloud Computing programs for learners. The program seeks to provide opportunities for diverse talent through tech employment programs.[27]

Continuous learning required to build digital skills

Yet less than half of workers are regularly updating their digital skills

The swiftly changing technology landscape increasingly necessitates continuous digital skill enhancement throughout one's career. **LinkedIn data analysis predicts that by the decade's end, 70% of job-related skills will change.**[28] Deloitte's Building the Lucky Country report highlights that flexible, lifelong learning is more effective than upfront "set and forget" education in supporting career longevity and advancement.[29]

Our workforce survey reveals most workers are actively engaging in digital reskilling and upskilling. An impressive 96% of technology workers have undertaken activities in the past year to enhance or maintain their digital skills, while 70% of the broader workforce have engaged in reskilling.[30] The relatively higher share of technology workers engaging in reskilling likely reflects the importance of maintaining up-to-date digital skills for their roles.

Engagement in upskilling diminishes as workers advance in their careers. Participation drops from 93% among younger workers (18–34 years) to 83% in mid-career (35–54 years) (Chart 5.3). This is despite the two-thirds of mid-career workers acknowledging a need to improve their digital skills.

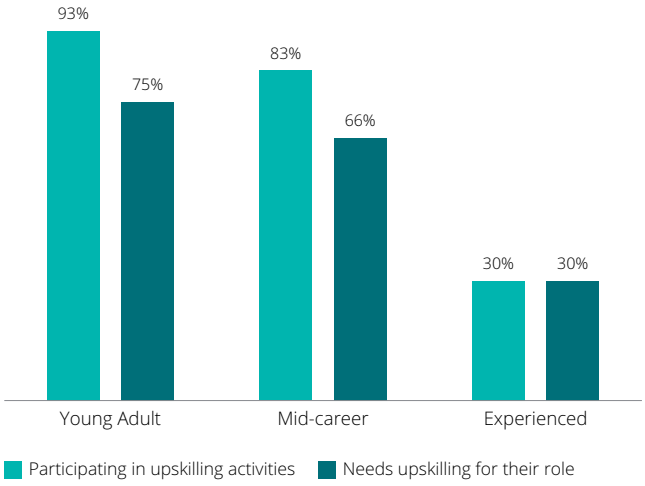
When it comes to the form of reskilling and upskilling, self-directed and employer-led training programs are some of the more common methods for upskilling (Chart 5.4). **Tech workers particularly favour more structured learning formats** – including industry certifications, short courses or VET – as a way of maintaining or developing their digital skills compared to the general workforce.

Time constraints are one of the most common barriers to workers engaging in reskilling or upskilling. Work commitments were cited by 43% of workers as preventing them from undertaking reskilling while 32% cited personal commitments.

The cost of training (36%) and a lack of employer support or funding (21%) are also common barriers, suggesting that workplaces could do more to enable workers to improve their digital skills, treating it as a priority and integrating it into business-as-usual operations.

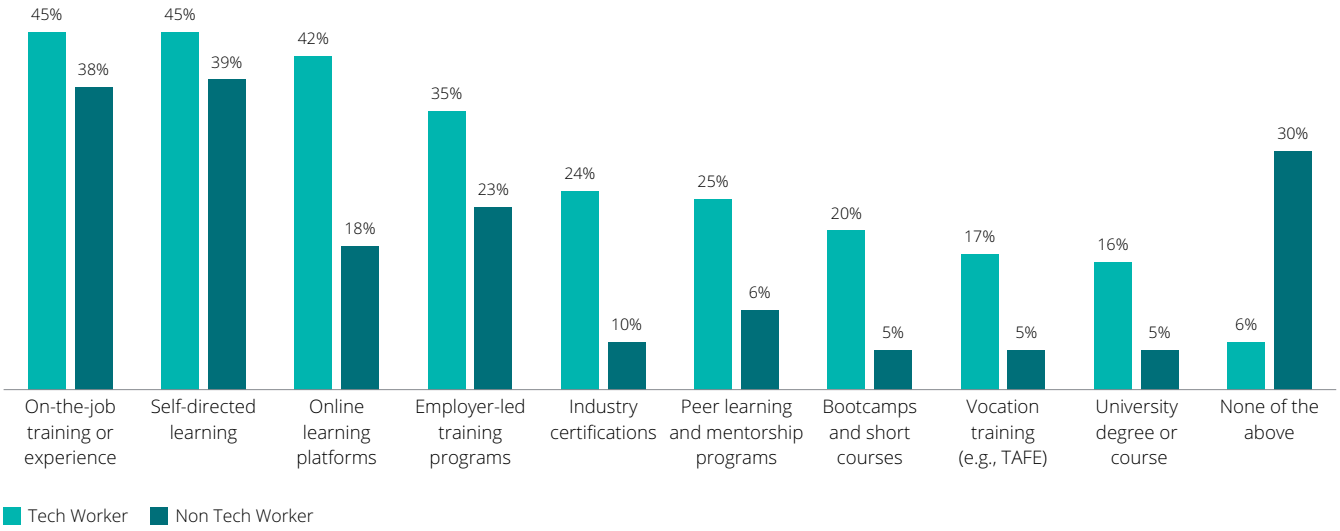
Despite relatively lower uptake by the broader workforce, widespread time and cost barriers to training suggest that cheaper, shorter and more flexible training pathways are likely a critical part of improving Australia's digital capabilities.

Chart 5.3: Proportion of workers not undertaking any activities to improve digital skills by age



Source: Deloitte Access Economics workforce survey (2025)

Chart 5.4: Upskilling activities workers have undertaken in the last 12 months



Source: Deloitte Access Economics workforce survey (2025)

Not everyone is seeing the return to training

Women are less likely to receive the benefits from digital training upskilling

Ensuring that digital training is effective is just as important as people participating in digital training. **If workers are not realising positive outcomes from their training efforts, then more needs to be done to align training with industry needs.**

Our workforce survey suggests that technology workers largely agree that key digital training outcomes are being met. More than three in four agree that they regularly use digital skills from training and a similar proportion indicate training has helped them advance their career (Chart 5.5). Fewer, but still a majority, agree that their digital skills are recognised by their employer and have led to a higher salary.

Yet the broader workforce are less likely to be achieving positive outcomes after they engage in reskilling or upskilling. Across four key metrics (use of digital skills, assisting with career advancement, recognition of skills and higher salary), the broader workforce is less likely to report digital training has led to positive outcomes. The broader workforce are almost half as less likely to report that training assisted with career advancement and fewer report that it has led to a higher salary.

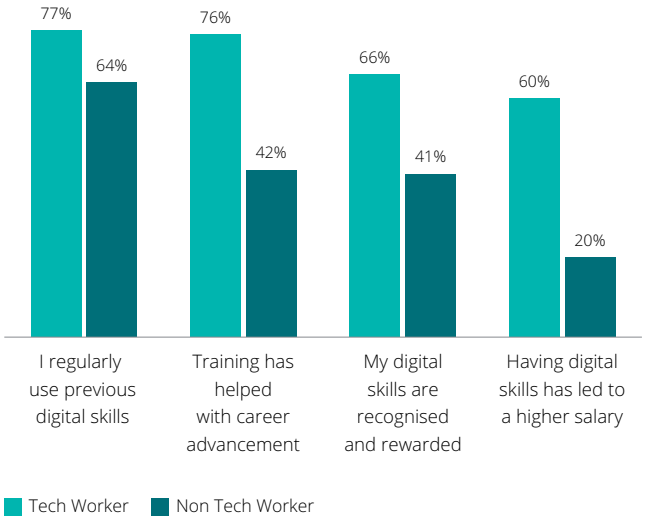
These findings demonstrate a disconnect between the digital training and outcomes for the broader workforce. With the rapid pace of technological change, this sentiment may discourage workers from undertaking the reskilling they need and risk some types of workers falling behind and being unable to realise the benefits of new technologies.

Our research indicates that women employed in the broader workforce, in particular, face a greater gap in reskilling recognition. Women outside the technology workforce are much less likely to agree that the digital skills gained through training are recognised by their employer (37% compared to 48% in men) or that they have led to a higher salary (only 17% compared to 25%). This disparity suggests that gender-related barriers, such as unconscious biases, may be limiting the potential benefits for women who undertake digital reskilling.

This finding is supported by a study conducted by Amazon Web Service (AWS) and Gallup across nine Asia Pacific countries (including Australia), which found that **women were less likely to receive positive benefits in promotions and higher salaries as a result of training**. However, the gender gap is smaller in Australia than in other countries such as New Zealand, Singapore and Malaysia.[31]

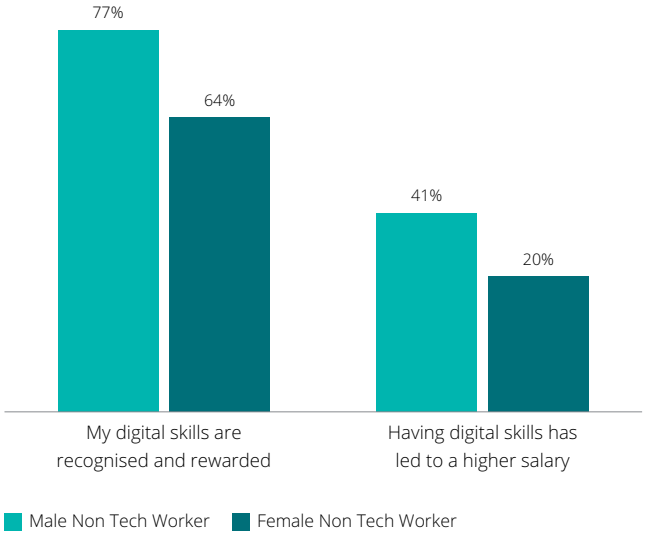
The disconnect between effort and reward for the broader workforce, and women in particular, highlights the urgent need for businesses to properly recognise digital skills training.

Chart 5.5: Agree/strongly agree with below options by technology worker status



Source: Deloitte Access Economics workforce survey (2025)

Chart 5.6: Agree/strongly agree with below options by technology worker status and gender



Source: Deloitte Access Economics workforce survey (2025)

Case study: Inspiring students to pursue tech careers through ACS' Young Tech Ambassador program

Demystifying pathways and possible careers in tech through industry ambassadors

The ACS Young Tech Ambassador (YTA) program has effectively engaged more than 16,000 school students through 58 presentations, aiming to inspire future generations to explore technology careers. Supported by the Queensland Government's Digital Professional Workforce Action Plan and ACS, this initiative continues to gain momentum.[26]

Jay Davis, an ambassador for YTA, shares his industry insights with students at The Busy School, promoting technology as a promising academic and career option. He stresses the importance of interactive activities, which help students cultivate essential creative and soft skills needed in tech careers.

One standout activity is the design sprint, where students devise solutions to hypothetical challenges. The design sprint was developed by Danielle Jones who is at YTA alongside Jay and provides hands-on exercises to hone student's problem-solving and creativity skills, offering them a practical glimpse into tech roles. Jay advocates that such engagement helps demystify the tech profession, presenting it in an enjoyable and informative way.

Jay believes the YTA program's strength lies in dispelling myths about the technology industry. It showcases diverse opportunities for those with digital skills and offers a realistic portrayal of tech careers. Highlighting how digital solutions can address social and economic challenges, along with travel opportunities, often serves as strong motivation for students.

The YTA program is also playing an important role in raising awareness of tech roles in regional and remote areas. Ambassadors have visited ten regional schools to advocate for technology careers and showcase robotics demonstrations. Jay urges the need for tailored content and activities in these communities, where access to technology is limited compared to metropolitan areas.

Despite challenges in measuring the program's impact, Jay remains optimistic. His prior mentorship and teaching experiences reveal that many students he has inspired have pursued further studies and successful careers in technology, maintaining contact with him for years and he expects the same for the YTA program in coming years.

> In my sessions, I highlight that no matter your hobby, interests or current skill level, there is a tech job out there for you. This industry thrives on endless possibilities, where passion and perseverance can often open doors that traditional qualifications cannot. With the right mindset, anyone can break into tech and succeed.
>
> **Jay Davis** ACS Young Tech Ambassador

Inspiring the next generation of tech professionals

- **Providing access to tech professional role models to inspire students**
- **Broadening the view of what a technology role looks like**
- **Reaching out to under-resourced communities that can lack access to tech**

Case study: AWS addressing digital skills shortages and broadening pathways into tech

Tackling digital skills gaps through the NSW Digital Skills and Workforce Compact

The NSW Digital Skills and Workforce Compact is a 7-year partnership between the NSW Government, major employers, digital industry groups, and education organisations to address growing digital skills shortages. The Compact aims to transform the digital workforce by promoting diverse career pathways, more closely aligning training with industry needs and leveraging government resources to boost digital job growth.

Jodi Phillips, Chair of the Compact board and Strategic Advisor - Public Sector for Amazon Web Services (AWS), explains the Compact's role in bridging digital skills gaps and expanding tech career pathways. Jodi affirms that tackling digital skills shortages is an **immediate goal to meet** our **long-term ambition of being a global technology nation**. It provides a way for industry partners to come together, approach the problem differently and establish frameworks for increasing **innovation, diversity and workforce agility**.

The board of the Workforce Compact is accountable for six projects currently being implemented by Compact partners, each addressing specific challenges or leveraging their expertise. Compact partners can **then apply and scale project learnings** in a national or global context. Jodi highlights this as a core aim of the Compact, which has accelerated collaboration and innovation in addressing digital skills shortages.

Increasing diversity of the digital workforce is also reflected in the Compact's Alternative Pathways Pledge which aims to create 20% entry-level roles for people from alternative pathways. Jodi emphasises that investment in digital skills is crucial for **increasing volumes** of people with the right skills entering the market and **extending opportunities** through diverse perspectives. Jodi advocates for **expanding career pathways**, especially for those who don't traditionally consider themselves as tech workers. AWS supports such initiatives through its Women in STEM Cadetships and Advanced Apprenticeships Program with Swinburne University, offering financial aid to women re-entering the workforce for digital qualifications. All of those who completed the 18-month traineeship in 2024 went on to receive full-time employment offers from AWS.

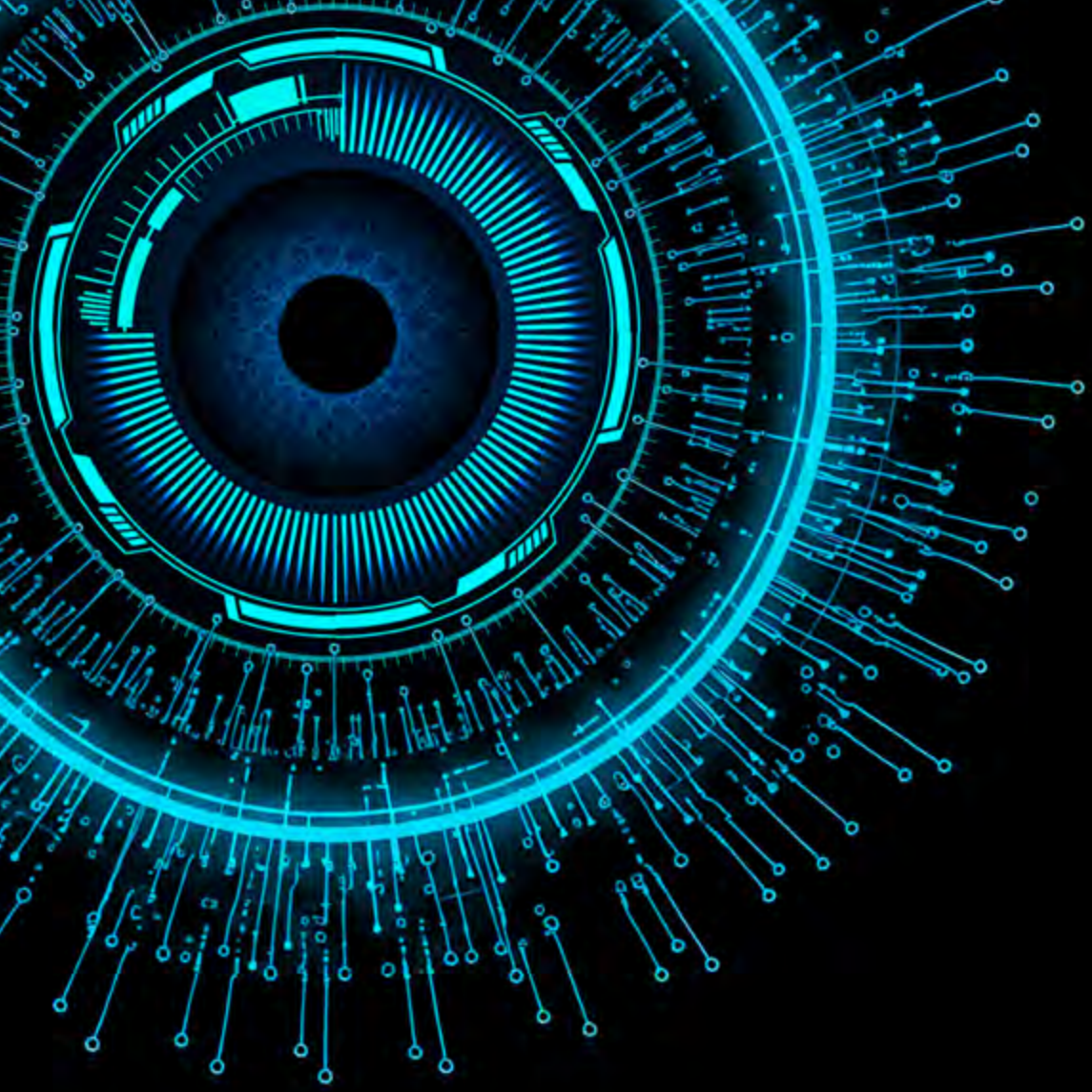
Challenges in closing the digital skills gap include the time and cost for employers to acquire, mentor and fund trainees, particularly for smaller businesses. Jodi says having private and public sector working together will go a long way to addressing the skills gap, as well as having specific government-funded technical apprenticeships to meet the needs of industry such as in certain fields like cloud technology and cybersecurity.

A further key challenge is retention of trainers and relevance of educational content in a fast-evolving industry, which AWS is actively building content for vocational institutions to help institutions to fill the training gap for emerging technology.

> "The NSW Digital Skills and Workforce Compact is the first time the broader business community are all at the table talking together in pursuit of a common goal.
>
> **Jodi Phillips** Strategic Advisor, AWS

Current projects within the NSW Digital Skills and Workforce Compact 2023–2025 Action Plan[2]

- **Project 1** Codesign and deliver a marketing campaign uplifting perceptions of digital careers
- **Project 2** Map and progress opportunities to improve retention in digital tertiary education and early careers
- **Project 3** Drive diversity in the digital workforce through mentoring and networking programs
- **Project 4** Digital training and jobs
- **Project 5** Establish a Digital Industry-Education forum
- **Project 6** NSW Government levers to support the Compact and Action Plan Outcomes



6 C-suite perspectives on digital skills

C-suite digital skill and knowledge is an enabler of businesses success

Businesses leaders face competing priorities but understanding the changing tech environment is essential

Navigating innovations in technologies such as AI, cybersecurity and robotic automation is essential for businesses success. Research finds that more than half of surveyed Australian business leaders cite digital transformation and extracting organisational value from it as the top challenge faced by businesses in 2025.[1]

Achieving digital transformation requires organisations to have **leaders with strong digital skills and knowledge to effectively manage change**. For example, research from the Reserve Bank of Australia (RBA) finds that businesses with IT industry experience on their board **were 30 percentage points more likely to adopt general-purpose technologies**.[2] However, the Governance Institute of Australia finds that only 7.2% of board directors have experience in the technology sector.[3]

For small- and medium-sized businesses (SMBs), where overconfidence in existing processes and decision paralysis are among the biggest barriers to digital transformation, building digital skills and knowledge across leaders is essential.[4] For example, a recent review of digital leadership finds that businesses treating digital leadership as a core business strategy, rather than just using technology for isolated tasks, are the ones that successfully scale their organisation.[5]

Enhancing the digital capabilities of leaders may translate into better commercial outcomes. A study published in the Sloan Management Review indicates that organisations in the United States that were led by digitally competent C-suite teams outperformed the rest of the organisations surveyed in terms of profitability and revenue growth.[6]

Despite the importance of digital technology less than a third of C-suite leaders – covering Chief Executive Officers, Chief Financial Officers and Chief Operations Officers – **identify understanding emerging technology, and digital knowledge and awareness as top skills for leaders** (Chart 6.1). Leaders rank skills such as financial and risk management, strategic planning, and operational efficiency as more important.

Leaders were asked to self-determine their level of capabilities across core activities, with most responding that they had a '**Capable**' level of skill. However, when comparing capability level across the board, **45% of C-suite leaders report a 'Basic' level of skill in one or more of the categories listed**. This shows that C-suite leaders often are lacking capability in at least one area and that Australia's C-suite leaders are not keeping pace with the ever-evolving digital transformation as much as they should be.

As organisations increasingly rely on emerging technology for innovation, efficiency, and customer engagement, **it is crucial for C-suite leaders to be aware of and understand how these technologies might impact their business**.

Change is already afoot. Analysis of C-suite job postings shows that organisations are shifting their hiring strategies to ensure leadership can navigate change.

They are seeking executives with the experience to help them better manage regulatory risks and are looking for **C-suite leaders who possess deeper technical skills to support the complex governance and technical needs of tech adoption**.[7]

Equipping leaders with skills to navigate technological change will require a multifaceted approach. Businesses should invest in programs to upskill their leaders' fluency in tech and regulations. While obvious, training is often neglected as **the demands of day-to-day challenges limit leadership teams from making progress unless they intentionally commit through formal initiatives**.

There are examples of organisations making leadership training a priority. For example, **one global professional services firm announced plans to enrol as many as 85% of its senior leaders in applied AI leadership programs**.[8]

Suncorp, an Australian insurance and banking company, is actively embracing AI into its operations. At least 160 of its leaders have participated in training programs that are delivered by the University of Sydney to understand how AI works, opportunities and risks or using AI and things to consider when developing an AI strategy for the organisation.[9]

Chart 6.1: Most important skills for C-suite leaders

Source: Deloitte Access Economics C-suite survey (2025)

Digital skills stocktake

Fast track a national framework for tech skills

Fast track the creation of a National Skills Taxonomy, and promote the integration of the SFIA framework to support workforce planning and skill development.

A national commitment to alternative pathways

A national commitment to 20% of entry-level tech roles coming from alternative pathways.

Implement an 'earn while you learn' scheme

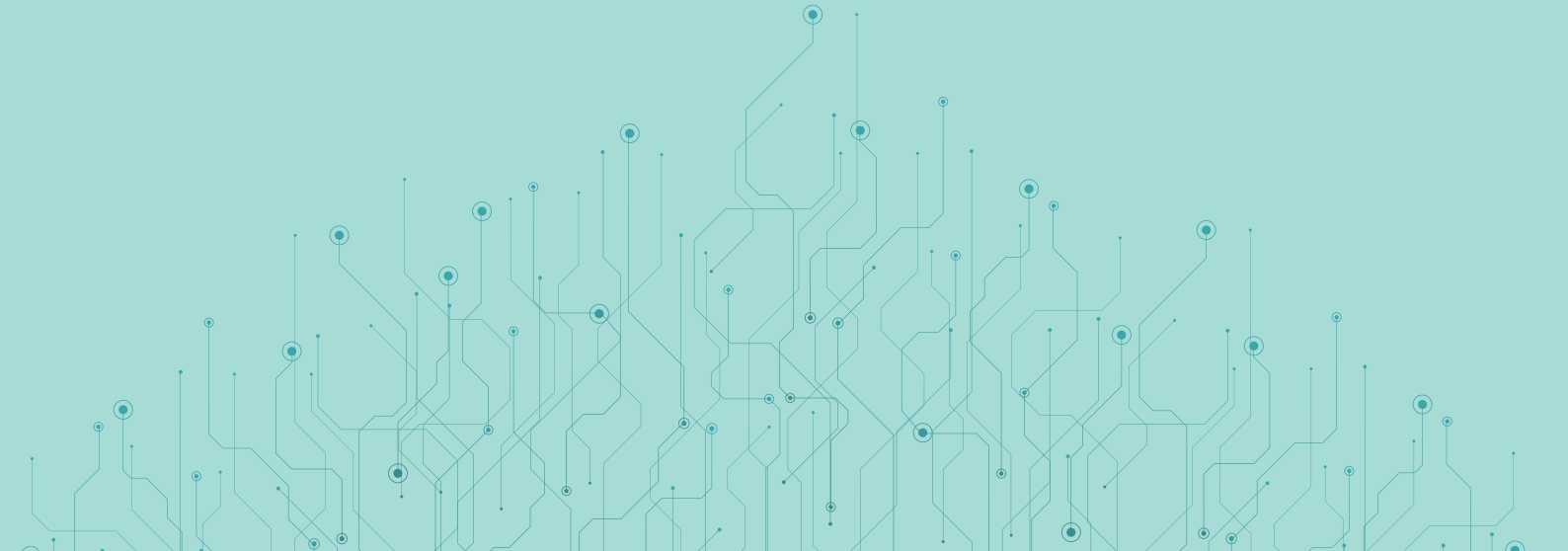
Reduce barriers to learning through a wage subsidy to encourage mid-career workers to undertake digital reskilling.

Promote entry-level pathways for cybersecurity

There is a shortage of entry-level roles for cybersecurity professionals, with most coming after gaining experience in software development. Relevant industry associations should encourage organisations to create more entry-level roles to support specialised career development in this skill.

Executives take a digital skills health check

C-suite executives should undertake a three-part digital skills health check to understand their own digital capabilities, the digital capabilities in their team and how the use of digital technologies fits within their current business strategy.

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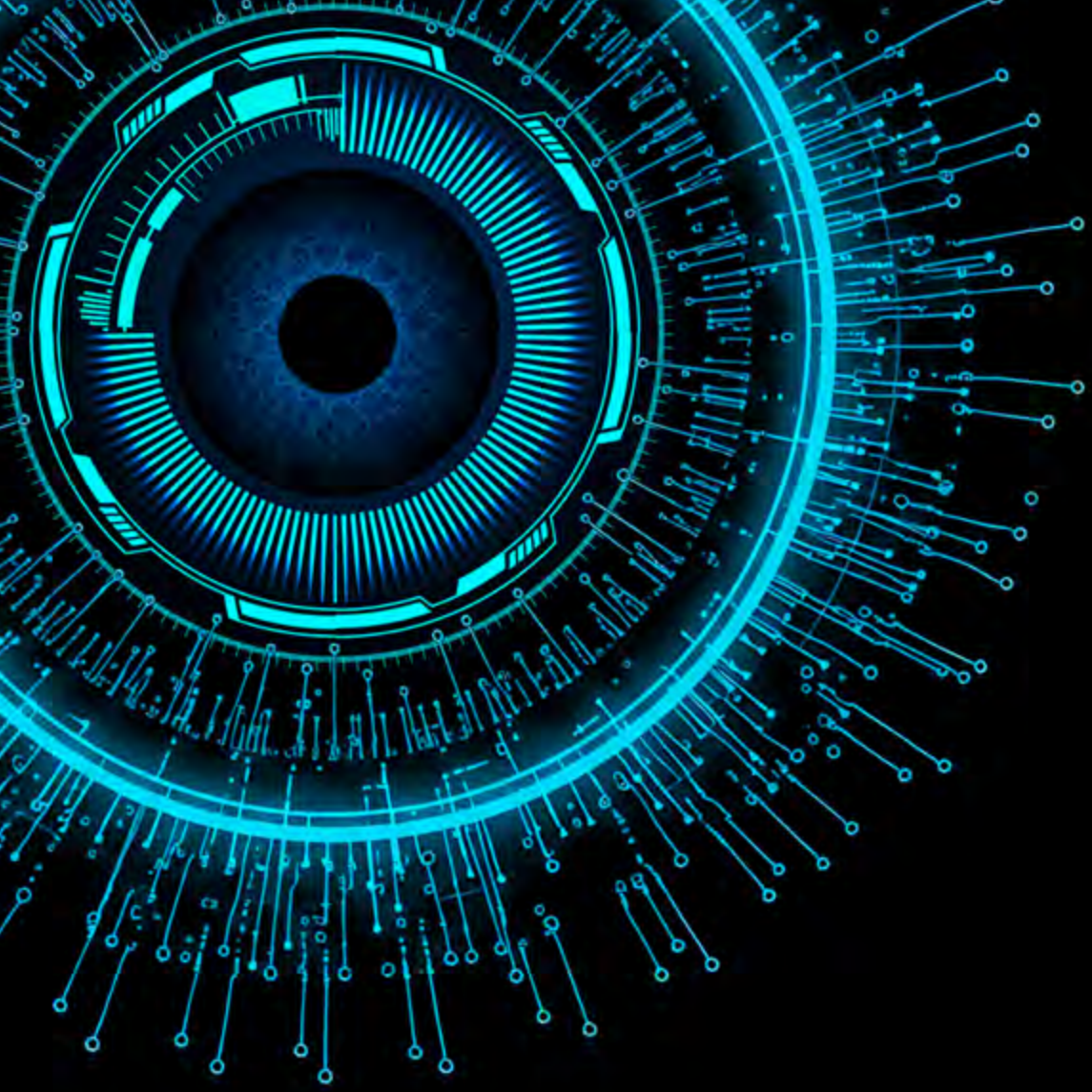


7 Boosting Australia's innovation landscape

The state of innovation in Australia

Australia could benefit from a single national innovation strategy, with a potential dividend of $6.3 billion from increased investment in R&D

The ability to innovate is a critical driver of both productivity and economic prosperity for Australia. While there are well documented examples of Australian innovation, including Wi-Fi technology and Cochlear implants, Australia faces challenges with systemically commercialising innovations. This is certainly true for digital and technology related innovation.

Expenditure on Research and Development (R&D) is a key input for innovation. In FY22, Gross expenditure on R&D (GERD) was $38.8 billion, a 40% increase in the past decade.[1] Despite this, growth in Australia's R&D investment continues to fall short of other Organisation of Economic Cooperation and Development (OECD) countries (Chart 7.1). **Australia's GERD as a share of GDP has been steadily diminishing for more than a decade**, from 2.1% in 2011 to 1.7% in 2024, well below the OECD average of 2.7% (Chart 7.1).[2]

When looking at R&D at an industry level we see investment in professional, scientific and technical services is experiencing robust growth (increasing from 15% in 2010 to 34% in 2022).[3] However, information, media and telecommunications R&D has remained a small share (5%) reaching $758 million in 2022. In contrast, professional, scientific and technical services received more than $6.9 billion.[4]

While areas like AI, quantum technologies, and cybersecurity show growth potential, risks remain. SMBs comprise 93% of businesses, limiting R&D scalability and unresolved data sovereignty issues in AI development require concerted policy action. Increasing R&D in high value-adding industries could lead to substantial dividends. Recent research commissioned by the Technology Council of Australia has found **that if Australia increases its R&D and technology investment to 2% of GDP, Australia stands to gain a $6.3 billion dividend to GDP in 2035.[5]**

Trends in Australian Intellectual Property (IP) issued suggest signs of IP stagnation in Australia, with a 2.4% decline in standard IP applications in 2023.[6] A significant portion (92%) of IP filings originate from overseas, highlighting Australia's propensity for adopting and diffusing new technologies.[7]

As a result of a lack of R&D, Australia has historically relied on adopting innovations developed overseas. For example, in FY23 **95% of the innovations that were adopted by Australian businesses were developed by overseas businesses, as opposed to local innovation.[8]** While adopting international innovations and best-practice is good, it may suggest barriers in both developing or commercialising Australian based advances.

Historical trends in innovation are likely to continue under a business-as-usual setting. Analysis of research activity and patent applications related to AI shows that, **while Australia contributed 1.6% of all AI research publications globally, it only contributed 0.2% of AI patent application inventions,**[9] revealing a substantial gap between research and practice.

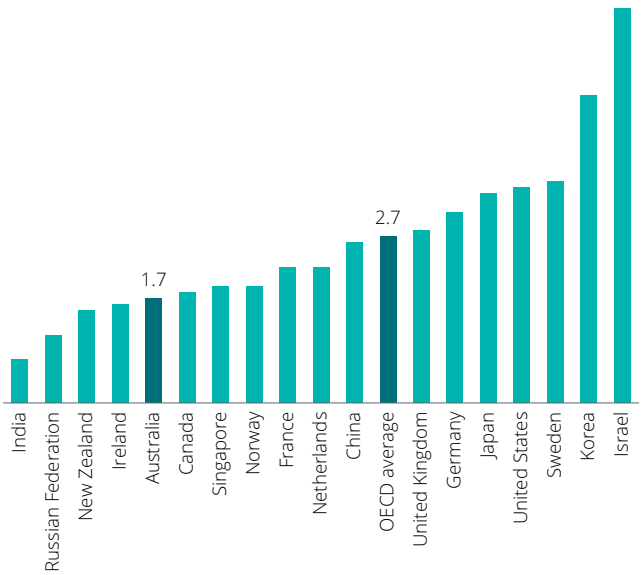
The R&D tax incentive plays a crucial role in driving innovation across Australia. While small businesses account for nearly half of the recipients, the largest beneficiaries are in diverse sectors like technology, biotech, health, natural resources, aquaculture, and waste management.[10] This diversity highlights Australia's innovative capacity and the emergence of sectors making significant advancements.

The current Strategic Examination of Australia's R&D system aims to bolster alignment with government priorities, enhance home-grown innovation, and boost business investment in R&D. **The examination is designed to encourage more research and innovation, ensuring sustained R&D supports long-term productivity, resilience, and prosperity.** It will highlight Australia's key areas and provide strategy on how to successfully grow investment, ensuring collaboration with industry, research institutions, governments and universities.[11]

Sources of innovation are not limited to R&D but also include investments in non-R&D categories such as productivity-enhancing technologies, enhanced business models, marketing and branding, and intellectual property acquisition. Previous government reviews have recommended government balance the amount of support provided for R&D and non-R&D based innovation.[12]

To encourage non-R&D innovation, government could implement direct measures to encourage greater investment in technology and digital innovation such as support for businesses to modernise ICT, or leverage mission-oriented policy levers to solve national challenges while stimulating key growth sectors and driving collaborative innovation.[13]

Chart 7.1: GERD as percentage of GDP, select countries, 2024



Source: OECD Science, Technology and Innovation Scoreboard (2024)

Boosting Australia's innovation through startups and scaleups

Unlocking the potential of Australia's startups requires improved access to funding for female founders

Startup and scaleup businesses are a key source of innovation for the Australian economy. These businesses bring new products, services and business models to Australia. For example, Australian startup Josef is using no-code AI to automate the day-to-day work of legal professionals across large firms and community legal centres alike, while fintech startup Brighte provides customers with simple and accessible financing options for installing solar panels and other renewable energy solutions.

Australia's startup and scaleup landscape continues to recover after the pandemic. In 2024, a survey of 1,000 startups revealed $4 billion was invested across 414 deals. These startups are leading technology adopters, **with 70% of founders saying they are using or are substantially assisted by AI for core team functions (an increase of 14% from 2023)**.

Increasing the number of startup and scaleups in Australia will require improving diversity among founders and their ability to access funding. There has been an increase in female founders to 27% in 2024, up from 16% in 2014. However, the gap in funding allocation remains wide. In FY22, only 0.7% of all private startup funding went to solely female founding teams, despite a significant increase in overall funding available.[14] In 2024, this share rose to 2%.

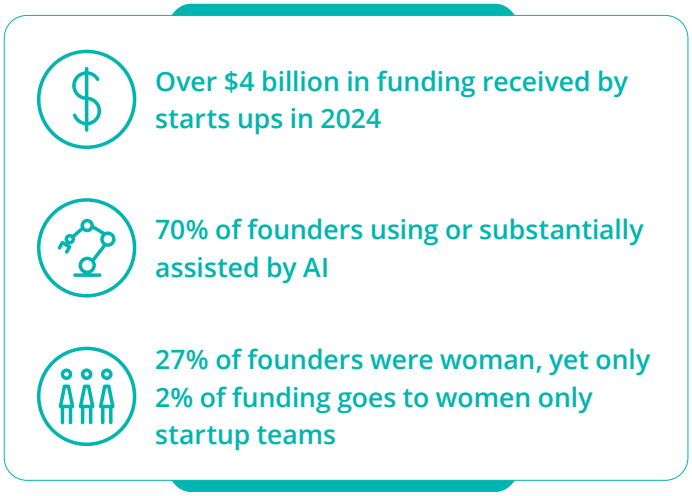
While this indicates an improvement, systemic challenges persist. **The economic opportunity of investing in women-led startups is significant; research indicates that for every dollar of funding, women-founded startups generate 78 cents of revenue, compared to 31 cents for male-founded startups.**[15] Improving access to funding for female-founded businesses could also unlock underrepresented opportunities for Australian startups and investors.

There has been an emergence of startups and incubators addressing women's health issues such as endometriosis, fertility and menopause. The women's health sector, a rapidly-growing global market valued at US$60 billion—represents an underrepresented opportunity for Australian startups and investors.[16]

Cultural diversity is increasing in Australian startups, with 28% of founders from non-English speaking backgrounds and over a third born overseas.[17] **First Nations entrepreneurs represent only 1% of all startups in Australia, yet it is estimated that First Nations businesses contribute $16 billion to the Australian economy each year and play a key role in community development.**[18]

While formal mentorship programs and initiatives—such as the Blak Excellence Fund for First Nations Entrepreneurs— exist, underrepresented founders still experience barriers gaining traction.[19] Tapping into established networks can be a vital step in gaining access to funding and a broader investor community, however these networks are not always accessible to founders from all demographics and backgrounds, making it difficult for outsiders to utilise them. This reflects a broader system challenge. Concerted and sustained efforts from the startup ecosystem are needed to remove these barriers. Doing so will allow Australia to fully capitalise on the potential of diverse talent within the startup ecosystem.

Figure 7.1: State of Australia's startup ecosystem



Source: Deloitte Access Economics (2025)

The scaleup opportunity in Australia's tech sector

Understanding the relocation trend and scaleup challenges of Australian startups

Australia has strong entrepreneurial spirit and innovation. It is the home of several notable success stories and a growing number of unicorn startups. However, the nation's startup ecosystem is confronted with scaleup barriers, with many promising startups struggling to grow to their full potential and, in some cases, choosing to leave the country.

The 'valley of death' describes the challenging journey from startup to scaleup in Australia. It's a phase where many Australian startups falter, unable to bridge the gap between early-stage funding and sustained, large-scale growth. In the startup ecosystem, the scaling process typically begins at the Series B funding stage (the second round of funding, typically sought for scaling a business), which is crucial for moving beyond early revenue and securing a larger customer base, often on an international stage. These challenges disproportionately affect women-founded and mixed-gender teams, who face structural obstacles throughout the entire startup and scaleup processes. Reports indicate that female-led businesses are 31% less likely to succeed in funding applications compared to their male counterparts, with academic research suggesting that this is linked to gender stereotypes and perceptions about "lack-of-fit" is a key driver behind this. [20, 21]

While many Australian startups experience initial success, they quickly face the daunting task of finding capital to support further expansion. One of the primary obstacles for Australian scaleups is the insufficient availability of capital. By 2030, Australia is expected to have a scaleup funding gap of $53 billion.[22]

Unicorn startups such as Atlassian and Canva opting to domicile overseas highlights the systemic issues that restrain many startups from successfully scaling up and commercialising in Australia. Notable examples of startups who tried their luck overseas include Conry Tech, Haventec, Mys Tyler, and Climate Salad.

However, some of these have chosen to return to Australia, such as Conry Tech, but it is noted that it is not driven by financial reasons, and that funding is still more widely accessible overseas.[23]

Over the past 20 years, approximately 11,000 startups and other businesses have left Australia for the US, UK and Canada, rather than choosing to establish themselves or grow their business in Australia.[24] This figure is based on the number of startup visas that were granted to Australians for selected countries. Analysis of Australian Taxation Office data reveals nearly 3,000 Australian citizens currently overseas generated business income of nearly $350 million in FY22. Of course, many founders are not reflected in these figures due to changes in citizenship. In fact, one startup that left Australian shores is Superpower, which is now worth more than $300 million.[25] Superpower is a personalised health care 'super-app', designed to make health care more accessible. Founder Max Marchione cites that one of the reasons he chose to build his startup in the United States was the comparative ease of starting-up in the tech space in Silicon Valley.[26]

In one study of startup founders intending to look for capital overseas, over half indicated that it is because they believed it presented them with better market opportunities, and one-fifth believed it provided better opportunities for their industry. While access to capital was mentioned, it was only selected by 11% of founders.[27]

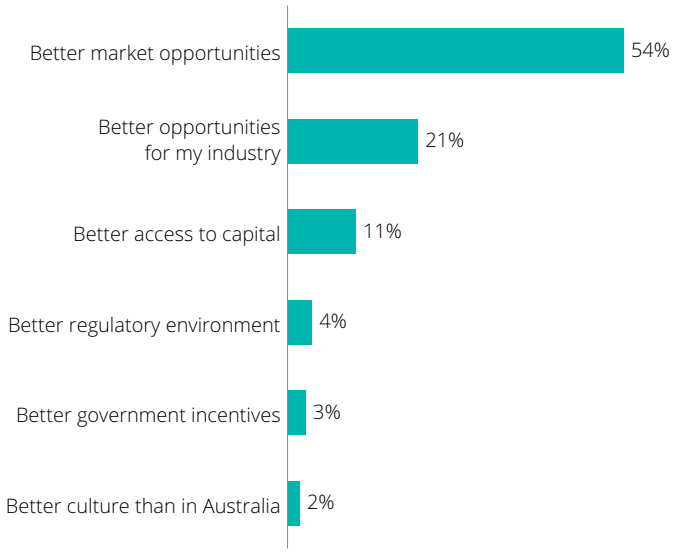
The most recent Startup Muster report shows better access to capital overseas was not the primary reason that startup-founders indicated they would relocate. Over half indicated that it was due to a belief that there were better market opportunities or better opportunities for their industry (Chart 7.2).[28] This speaks to some broader challenges.

Scaling a startup requires skilled leadership and a workforce capable of navigating the complex challenges that come with rapid growth. Australia's tech workforce is relatively young, with only 1% of its tech professionals experienced in scaling startups.[29]

In contrast, 17% of Singapore's tech workforce and 13% of the US tech workforce have this experience.[30] Increasing the number of skilled tech professionals through migration and strong startup ecosystems in universities could help reduce Australia's skilled tech shortfall. By focusing on cultivating a more experienced talent pool, Australia can create a workforce capable of supporting global expansion.

There is a significant opportunity for Australia to improve its support for scaleups and build an ecosystem that nurtures homegrown global tech companies.

Chart 7.2: Reasons for startup founders indicating they intend to move overseas



Source: Startup Muster (2024)

Case study: Startup Muster providing better data for better decisions to support Australia's startup ecosystem

Improving the availability and use of funding sources is a key priority

Australia's economic landscape is uniquely suited for a diverse range of startups. Startup Muster supports these startups through the most comprehensive survey of the startup ecosystem in Australia.

Murray Hurps, Managing Director of Startup Muster, discusses how the most recent survey of more than 1,000 startups in 2024 provides surprising and actionable insights that can boost the growth of this ecosystem.

The rise of deep-tech startups is one recent surprise, with 22% of startups now being considered 'deep tech'.These ventures are pioneering new products and services for both domestic and international markets. Among them, 13% have emerged from research commercialisation, 50% are advancing patentable intellectual property, and 40% have engaged with research organisations recently. This expanding segment necessitates enhanced understanding and support to fully realise its potential.

Murray also underscores the crucial yet often underestimated contribution of international talent to Australian startups. Over a third (35%) of startup founders are overseas-born, and 23% employ individuals on visas.[1] The two most-used visas for founders are the graduate working visa, followed by the student visa, highlighting the role of international education in feeding the local innovation ecosystem.

Startup Muster data reflects there has been a major reset of funding sources at a state and Commonwealth level, with most grants previously secured by startups no longer being continued. Simultaneously, there is a lack of planned utilisation of programs like Industry Growth Program (only 7% of startups planning to apply) and long-term under-utilisation of the Research and Development (R&D) tax offset (8% planning to use).

Startup Muster has previously done work to measure the impact of the pandemic on the innovation ecosystem, finding that 80% of incubators and accelerators across the country ceased operating as a result. Murray explains that this 'great reset' of the Australian startup ecosystem is still playing out and has led a significant shift towards university-affiliated programs. Murray notes that many of these programs are now struggling because of budget cuts that are unfolding as a result of restrictions on international student numbers, potentially leading to a second "great reset" in the coming years.

> Australia has the most geographically dispersed startup ecosystem in the world. The unique economic climate here, and the business crops that are suited to this climate, need to first be understood, then work needs to continue to start and grow more of these companies.
>
> **Murray Hurps** MD, Startup Muster

Creating a sustainable pipeline of entrepreneurs

- **Government needs to understand the characteristics of local startups**
- **Greater access to global talent through migration**
- **Support existing startup supporters to avoid a second "great reset"**
- **Engage potential entrepreneurs early in their careers**

Boosting Australia's innovation landscape

Develop an innovation strategy

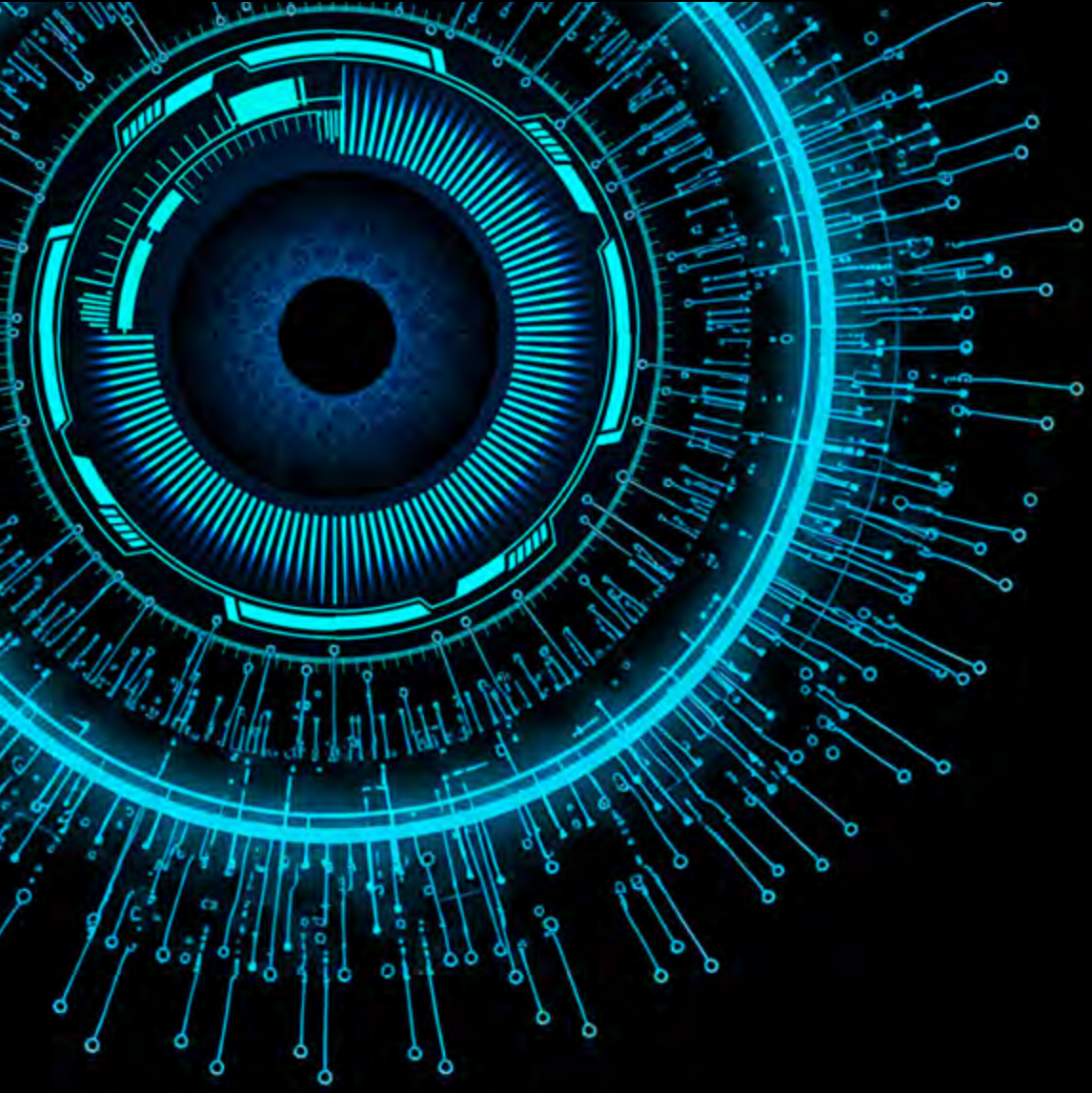
Create a national innovation strategy that encourages more entrepreneurship in the Australian workforce and identifies a vision for Australia's startup and scaleup community.

Support more scaleup Australian business

Strategic Australian Government co-investment and support for scaling businesses in priority sectors could play a valuable role in strengthening innovation and supporting diverse founders.

Greater incentives for R&D in AI and tech adoption

The Strategic Examination of Research and Development and the AI Capability Plan should focus on how to encourage greater R&D into AI and promote non-R&D innovation through greater tech adoption across Australian businesses.



8 Sovereign AI capabilities for Australia

Australia can safeguard critical assets and industries through sovereign AI

However, Australia risks being left behind without substantial investment

AI is rapidly becoming a foundational technology driving the next wave of the digital revolution. However, Australia risks falling behind peer economies lagging in areas such as investment, skill development and regulatory maturity. For example, **since 2013 Australia's private investment in AI has only totaled $6 billion, less than 1% of US investment and two thirds of that invested by APAC neighbour Singapore** (Chart 8.1).

The geographic concentration of AI investment reflects that the technology is still in the model building phase with 88% of model development currently occurring in the US and China.[1] While this provides Australia the opportunity to adopt overseas AI innovations to improve domestic productivity, it also presents risks in some use cases. Risks around whether models support Australian interests. Whether they can be fine-tuned to support Australia's unique workforce and industries. Whether they behave according to our norms, cultural and ethical expectations.

These risks can be addressed by establishing sovereign AI capabilities which include AI that is owned, operated and controlled in Australia, and powered by Australian talent and compute. This includes the physical infrastructure but also data infrastructure such as globally developed open source models that are trained and fine-tuned using Australian datasets and to reflect local language, cultures, and value systems.

Other countries are already acting with the UK, Germany, India, Singapore and Japan having announced initiatives or proposed legislation to establish sovereign capabilities.[2] For example, Singapore initiated an $80 million program to develop a base model with regional context that can understand its linguistic characteristics and multilingual environment, while India is seeking to align a foundation model to Indian language and culture.[3, 4]

Building sovereign AI capabilities in Australia will be important for ensuring ethical alignment, operational control, and resilience across sectors in the public interest such as defence, national security, intelligence, public services and critical infrastructure.[5] For these sectors sovereign AI capabilities will help to reduce security and reliability risks in times of crisis and safeguard Australia's capabilities in situations where the interests of the nation and owners of large commercial models diverge over time. This has previously occurred in the digital platforms sector with providers threatening to switch-off parts of services in Australia.[6, 7]

Sovereign AI also **enables greater control over the use and storage of metadata and data that which is important to Australia as a nation.** This include critical and high-value datasets in areas such as health, agriculture, mining, and the environment. Maintaining sovereignty ensures that these assets are used responsibly and protected by appropriate ethical safeguards. For example, Indigenous data sovereignty principles can be embedded into AI design to allow for the preservation and protection of cultural knowledge, and Indigenous Cultural and Intellectual Property rights.

Sovereign AI extends beyond the ability to build train and fine-tune models domestically, to include the capability of government to develop, maintain and deliver functions and services using AI technology despite changes in the ecosystem of AI suppliers.[8] Sovereignty is important to ensure models can be trained on culturally specific datasets to make AI interactions with government inclusive and relevant.[9]

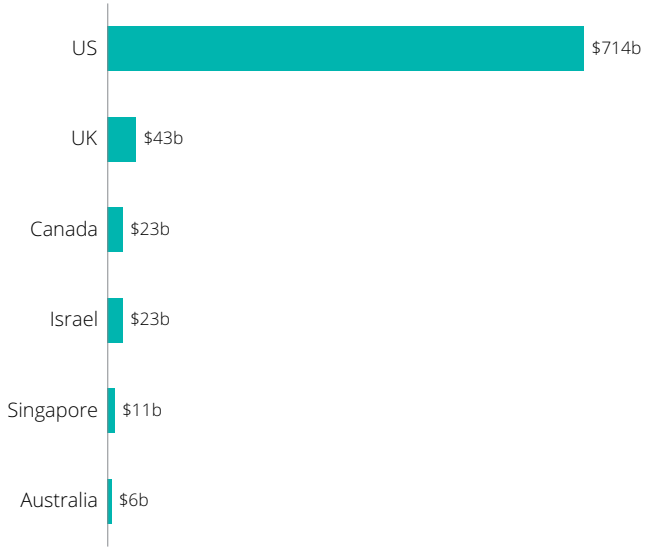
Developing sovereign AI capabilities does not mean competing with or directly replicating the work of established players but operating a sovereign capability alongside them, which allows for independent development, modification, and oversight when national priorities demand it.[10]

Figure 8.1: Components of sovereign AI

Sovereign AI in Australia

- Infrastructure and data control
- Models trained and fine-tuned locally
- Local capability
- Reduced foreign dependence
- Self-determination

Chart 8.1: Private investment in AI from 2013 to 2024



Source: 2025 AI Index report

"

We've got all the ingredients — the talent, the technology, the opportunity — but we're not making the cake. We're an obvious place for building sovereign AI infrastructure — there is no reason why we shouldn't be investing.

Dr Sue Keay
Director, UNSW AI Institute

Domestic AI capabilities represent a key economic opportunity for Australia

Investing in sovereign AI drives economic growth, talent development and opportunity

Developing sovereign AI capabilities requires having the infrastructure to support domestic AI training, inference and compute. Investment in supporting infrastructure is growing with Morgan Stanley estimating that data centres will grow from 5% (1,050 MW) of Australia's electricity consumption to 8% (2,500 MW) by 2030.[11]

Australia is well placed to meet this demand with ample land and energy production potential for building and powering these data centres. Already companies have moved to increase capacity in Australia with Nokia and ResetData set to launch Australia's first sovereign AI data centre in Melbourne this year, NEXTDC announcing a $2 billion AI factory and technology campus, and with Amazon planning to invest a total of $20 billion in Australian data centre infrastructure through 2029.[12, 13, 14]

As well as supporting domestic capabilities, Australia's capacity to deploy and power data centres at scale provides an opportunity for Australia to serve as the AI backbone to our regional neighbors which lack the real estate and reliable access to the power needed to build and operate AI data centres. As the world continues to decarbonise, Australia's access to abundant renewable resources will act as an accelerator of this opportunity.

With countries and companies making decisions now about the direction of their AI investments, certainty around Australia's future energy mix and investment is needed so that Australia can support sovereign AI capabilities while maintaining net zero commitments.[15] Considering what backhaul investment may be needed to ensure robust connectivity to key international partners is also important for realising the AI export opportunity.

Alongside investment in data centres and other infrastructure, an overhaul of network and computing infrastructure is required to support sovereign AI development. High-performance computing and data (HPCD) infrastructure is a critical enabler for AI development, providing the computing power needed to train and run advanced models. Currently, Australia's HPCD facilities are near capacity and without investment, will struggle to meet future demand.

Getting the setting right for sovereign AI would be an accelerator of Australia's broader AI ecosystem by helping to catalyse Australia's AI adoption, talent and processes. For example, it would be an enabler for industries where Australian intellectual property and data provide a comparative advantage to make Australia a maker, rather than a taker, of AI foundation models in targeted areas, increasing the number and value of commercial AI exports.[16, 17] This could also help create innovation spillovers that can drive broader economic growth through improving productivity.

The future of how AI models will be trained or constructed in years to come is uncertain, but we do know that that the right foundations to build upon whatever emerges is crucial. Sovereign capabilities across data, infrastructure and talent will be enables of this for Australia.

Developing national capabilities in AI development would also help stimulate talent development by encouraging investment in education, research and training programs. This broader development of AI talent is important for Australia's AI ecosystem with growing demand for AI expertise contributing to an estimated shortfall of 60,000 AI professionals by 2027.[18] However, to fully benefit Australia must also create clear pathways and opportunities for talent retention by fostering supportive R&D and startup growth environments.

Developing sovereign AI capabilities requires a coordinated national approach towards regulatory maturity and investment in critical infrastructure, talent, and innovation. This should begin with a clear and consultative national AI strategy that sets out a long-term vision for sovereign AI development. In addition, Australia needs to focus on:

- Identifying and retaining access to nationally significant datasets to use as training assets for sovereign AI models.
- Investing in critical AI infrastructure, including data centres and supercomputers. An estimated $2-4 billion will be required to upgrade existing and build new HPCD and other critical infrastructure.
- Accelerating skill development to increase AI expertise in Australia.
- Creating an accountable and adaptive regulatory environment that balances safety with innovation. For example, developing mandatory guardrails specifically for high-risk AI settings that ensure that any non-sovereign components do not have nefarious or undocumented behaviors.
- Implementing incentives directed towards facilitating R&D, including reducing challenges faced by Australian startups in access to capital

Boosting sovereign capabilities

Develop a national sovereign AI strategy

Australia should develop a clear and consultative national sovereign AI strategy that sets out a long-term vision for sovereign AI development, facilitating a coordinated national approach towards regulatory maturity and investment in critical infrastructure, talent, and innovation.

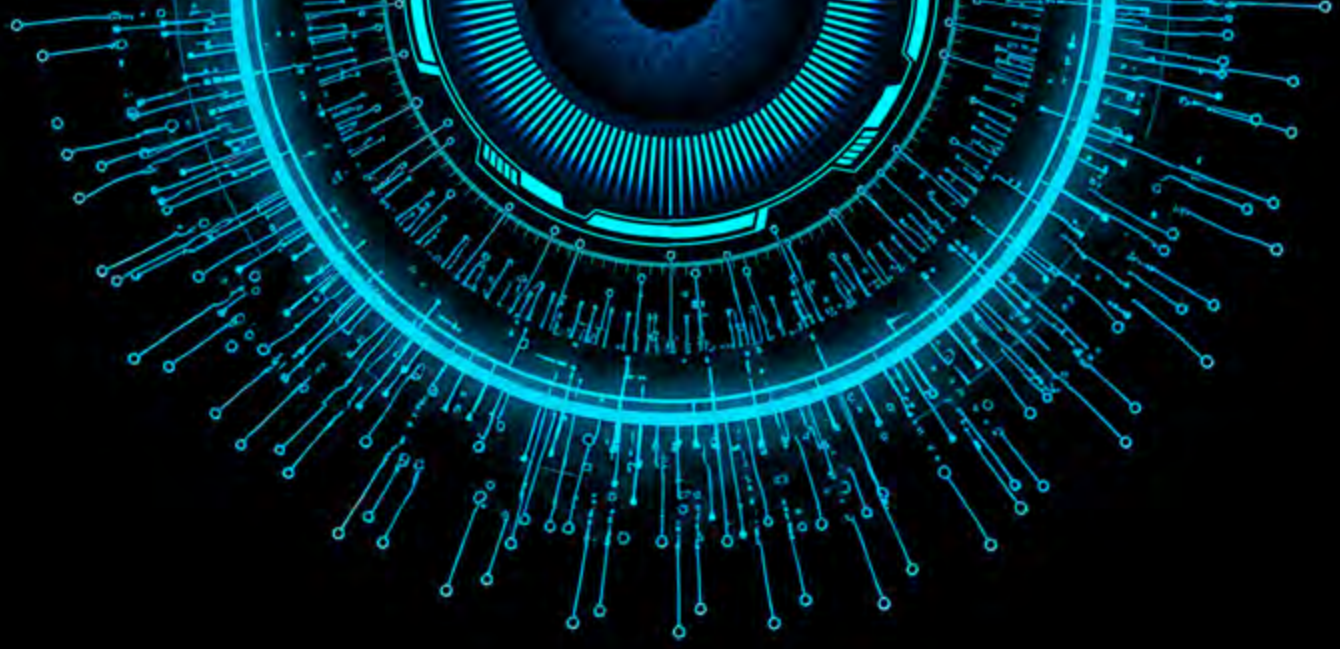
Develop a sovereign system layer for government

Government should fund the development a sovereign system layer for government. Development could be aimed at enhancing reasoning, task orchestration, and safe deployment of globally available models within Australian contexts, and design-led UI/UX improvements to public-facing AI systems.

"

AI infrastructure is not optional. It is core to economic competitiveness, digital sovereignty, and national resilience. Jurisdictions that can deliver in the global infrastructure race are well placed to attract the capital, talent and AI investment that goes along with it.

Craig Scroggie
CEO and Managing Director, NEXTDC

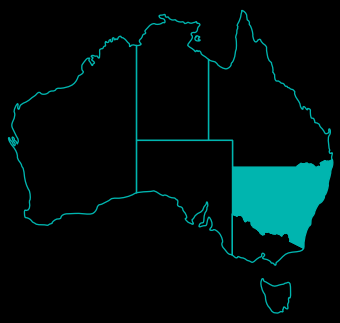


Appendix A

Digital economy snapshots and statistical compendium

Digital economy snapshot – New South Wales

NSW is a leader in technology and innovation investment. The NSW Innovation Blueprint 2035 commits to growing the state's innovation ecosystem, with key actions including support for talent development, funding for major innovation hubs such as Tech Central, and fostering stronger collaboration between research, government, and industry.



Size of the sector

$54 billion
Value add to the economy

371,300
Technology workers in 2025

+562,000
Technology workers by 2035

59 million
Working hours per week spent on digital tasks (40% of work hours)

Digital skills snapshot

Skills tech workers need to improve for their current role

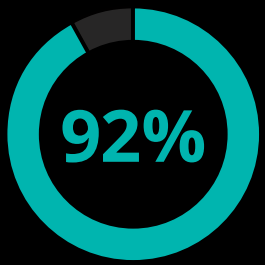
- 44% Robotic process automation
- 43% Artificial intelligence and machine learning
- 40% Virtual and augmented reality

Areas in which tech workers plan to upskill

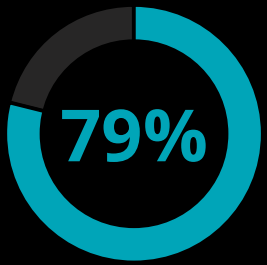
- 49% Cybersecurity
- 48% Artificial intelligence and machine learning
- 39% Data analytics and visualisation

Participation in upskilling

Proportion of workers actively improving or maintaining their digital skills



Technology workers



Other workers

Barriers in upskilling

- 45% Lack of time due to work commitments
- 39% High cost of training or education
- 34% Lack of time due to personal commitments

Digital economy snapshot – Victoria

Victoria has a competitive tech sector, with strengths in cybersecurity, health and medical research, advanced manufacturing, and renewable energy. The 2025 Victorian Industry Policy highlights the state government's commitment towards growing the emerging and advanced technology sector. The government also encourages innovation by supporting industry and research collaboration through the Cooperative Research Centres program.

Size of the sector

$36 billion
Value add to the economy

300,400
Technology workers in 2025

+405,800
Technology workers by 2035

48 million
Working hours per week spent on digital tasks (40% of work hours)

Digital skills snapshot

Skills tech workers need to improve for their current role

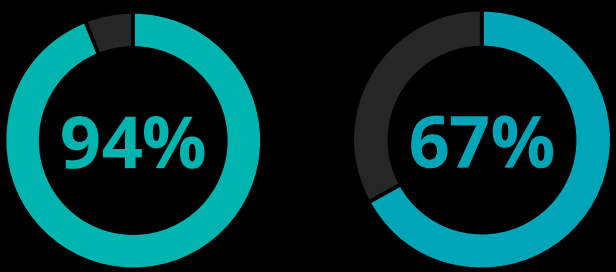
- 43% Virtual and augmented reality
- 40% Artificial intelligence and machine learning
- 33% Robotic process automation

Areas in which tech workers plan to upskill

- 50% Cybersecurity
- 47% Artificial intelligence and machine learning
- 41% Data analytics and visualisation

Participation in upskilling

Proportion of workers actively improving or maintaining their digital skills



Technology workers

Other workers

Barriers in upskilling

- 43% Lack of time due to work commitments
- 36% High cost of training or education
- 31% Lack of time due to personal commitments

Digital economy snapshot – Queensland

Queensland is home to an increasingly diverse tech ecosystem, with strong growth in industries such as advanced manufacturing and space. With the Brisbane Olympic Games upcoming in 2032, sportstech is a focus area of the state government. Other priorities for the government include improving regional connectivity, and growing the tech talent pipeline, as set out in Queensland's digital economy strategy.

Size of the sector

$15 billion
Value add to the economy

159,000
Technology workers in 2025

+201,800
Technology workers by 2035

35 million
Working hours per week spent on digital tasks (40% of work hours)

Digital skills snapshot

Skills tech workers need to improve for their current role

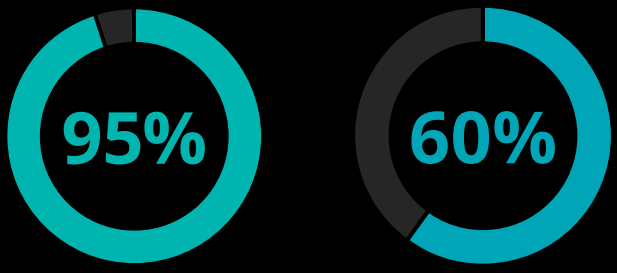
- 47% Robotic process automation
- 45% Virtual and augmented reality
- 42% Artificial intelligence and machine learning

Areas in which tech workers plan to upskill

- 53% Cybersecurity
- 40% Artificial intelligence and machine learning
- 40% Governance, risk and regulatory compliance

Participation in upskilling

Proportion of workers actively improving or maintaining their digital skills

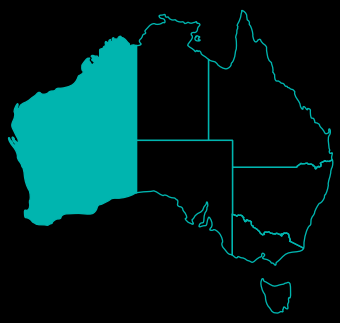


Barriers in upskilling

- 46% Lack of time due to work commitments
- 42% High cost of training or education
- 39% Lack of time due to personal commitments

Digital economy snapshot – Western Australia

Western Australia is experiencing a spike in innovation activity, particularly within the natural resources sector where robotics has transformed the industry The WA government aims to elevate the state into a hub of invention and innovation within the next ten years through its Innovation Strategy. Key initiatives include implementing a new biodiscovery legislation, supporting innovation precincts, advancing accelerator programs, and trialling a venture support program.



Size of the sector

$8 billion
Value add to the economy

84,700
Technology workers in 2025

+123,000
Technology workers by 2035

19 million
Working hours per week spent on digital tasks (40% of work hours)

Digital skills snapshot

Skills tech workers need to improve for their current role

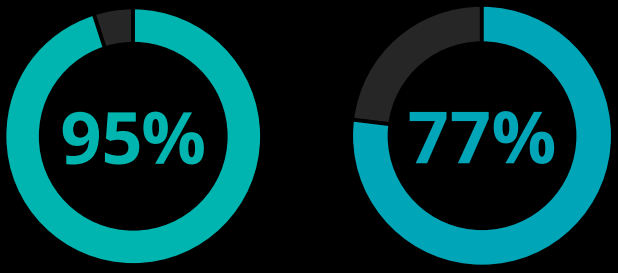
43%	Artificial intelligence and machine learning
41%	Robotic process automation
37%	Virtual and augmented reality

Areas in which tech workers plan to upskill

50%	Artificial intelligence and machine learning
41%	Data analytics and visualisation
38%	Software development and engineering

Participation in upskilling

Proportion of workers actively improving or maintaining their digital skills



Technology workers

Other workers

Barriers in upskilling

48%	Lack of time due to work commitments
41%	High cost of training or education
31%	Lack of time due to personal commitments

Digital economy snapshot – South Australia

Home to several innovation precincts, South Australia is a hub for cybersecurity and defence technology research. Key priorities of the South Australian Government include growing AI and cybersecurity capabilities. The government funds innovative AI startups and research institutes, and has developed capability matrices to encourage investment and collaboration.

Size of the sector

$5 billion
Value add to the economy

40,800
Technology workers in 2025

+89,400
Technology workers by 2035

11 million
Working hours per week spent on digital tasks (40% of work hours)

Digital skills snapshot

Skills tech workers need to improve for their current role

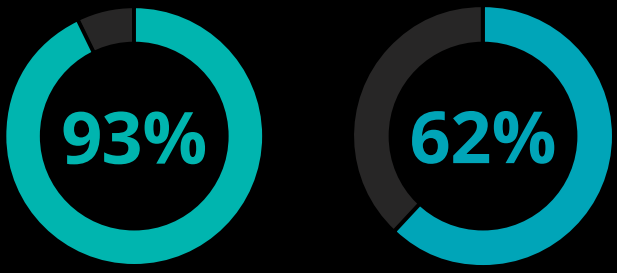
- 44% Cybersecurity
- 43% Virtual and augmented reality
- 38% Data analytics and visualisation

Areas in which tech workers plan to upskill

- 58% Artificial intelligence and machine learning
- 53% Software development and engineering
- 47% Cybersecurity

Participation in upskilling

Proportion of workers actively improving or maintaining their digital skills



Technology workers

Other workers

Barriers in upskilling

- 47% Lack of time due to work commitments
- 44% High cost of training or education
- 31% Lack of time due to personal commitments

Digital economy snapshot – Tasmania

Tasmania has an innovative technology industry across specialised sectors such as agriculture, marine technologies and creative industries. The Technology Industry Skills Compact is a key government-industry collaboration and aims to support ICT training, increase industry involvement in training and provide shared infrastructure to enable students to train on modern technology.

Size of the sector

$1.1 billion
Value add to the economy

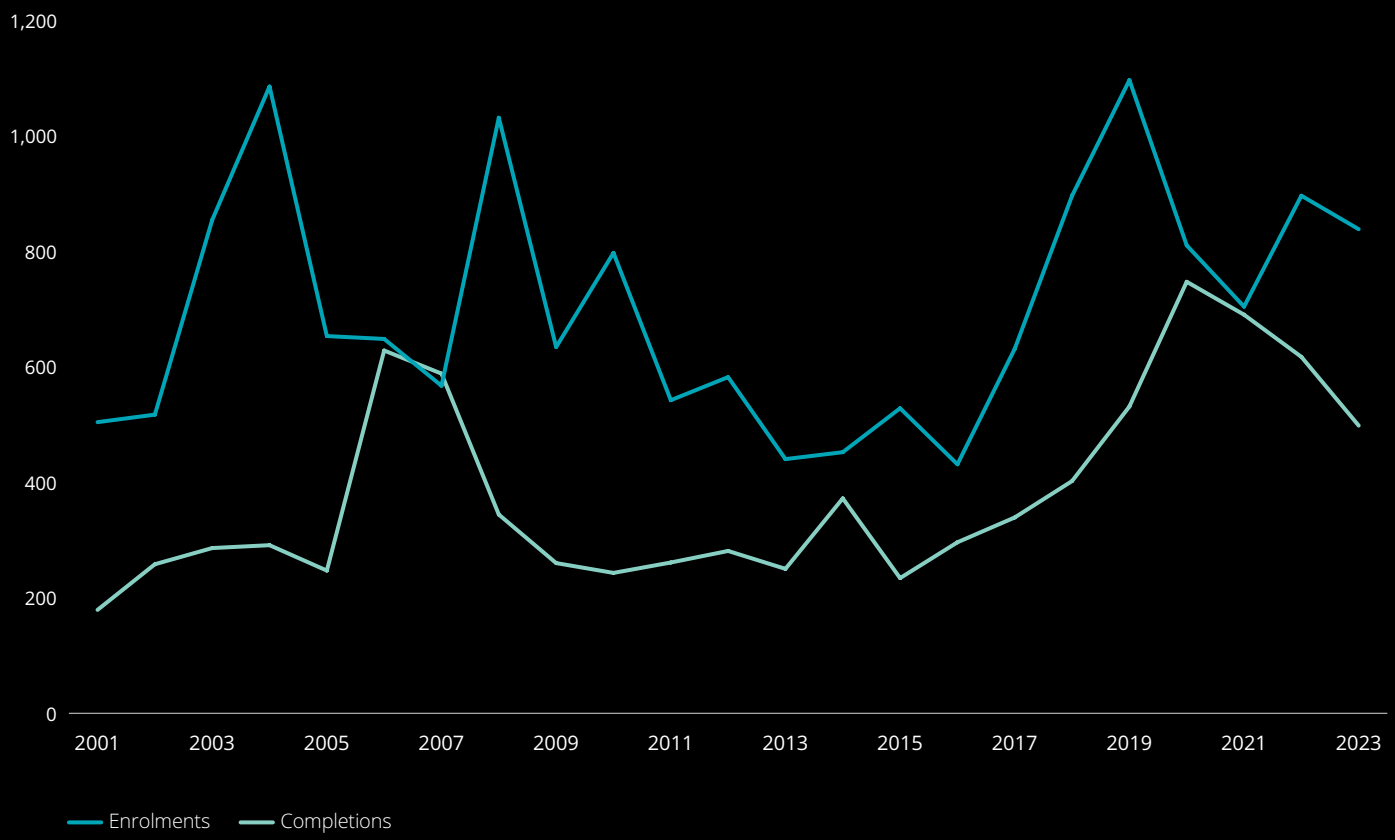
11,200
Technology workers in 2025

+21,200
Technology workers by 2035

3.1 million
Working hours per week spent on digital tasks (40% of work hours)

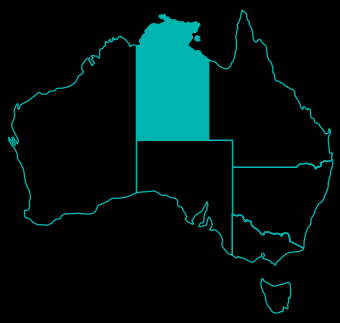
Education trends

Total enrolments and completions of ICT qualifications in Tasmania 2001-2023



Digital economy snapshot – Northern Territory

The Northern Territory digital industry provides diverse services, with innovations adapted to the state's unique environment (e.g. more extreme climate and geographical remoteness). The state government is supporting digital industry growth through investment into key infrastructure such as the $80 million D1 Darwin data centre, and the Vocus Darwin-Jakarta-Singapore Cable.



Size of the sector

$538 billion
Value add to the economy

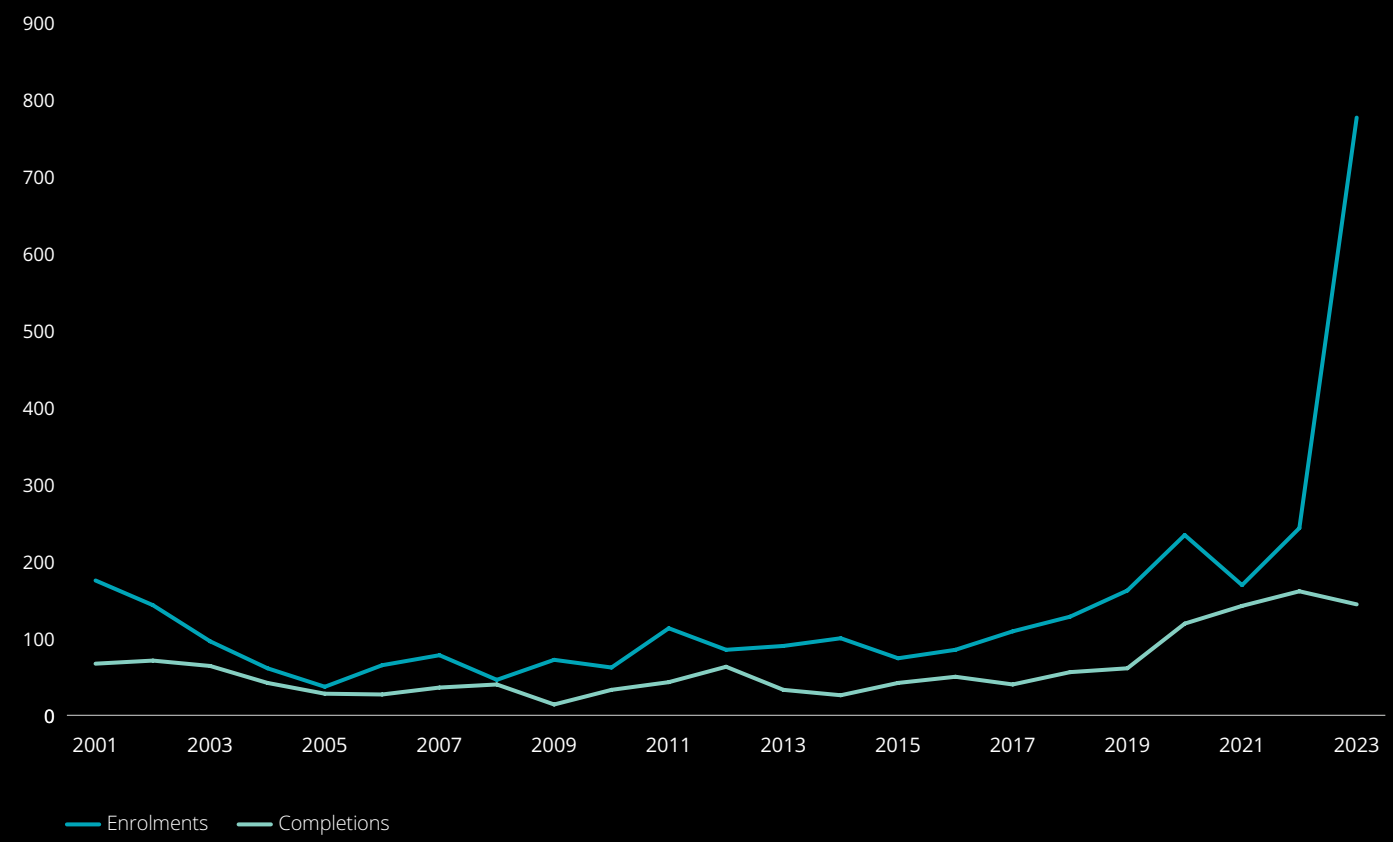
5,100
Technology workers in 2025

+10,800
Technology workers by 2035

1.6 million
Working hours per week spent on digital tasks (40% of work hours)

Education trends

Total enrolments and completions of ICT qualifications in Northern Territory 2001-2023



Digital economy snapshot – Australian Capital Territory

The ACT has a robust tech ecosystem, featuring strong cybersecurity, quantum, cloud computing, and space industries. Priorities outlined in the ACT government's Digital Strategy include supporting digital skill development and investing in emerging tech sectors.

Size of the sector

$4.4 billion
Value add to the economy

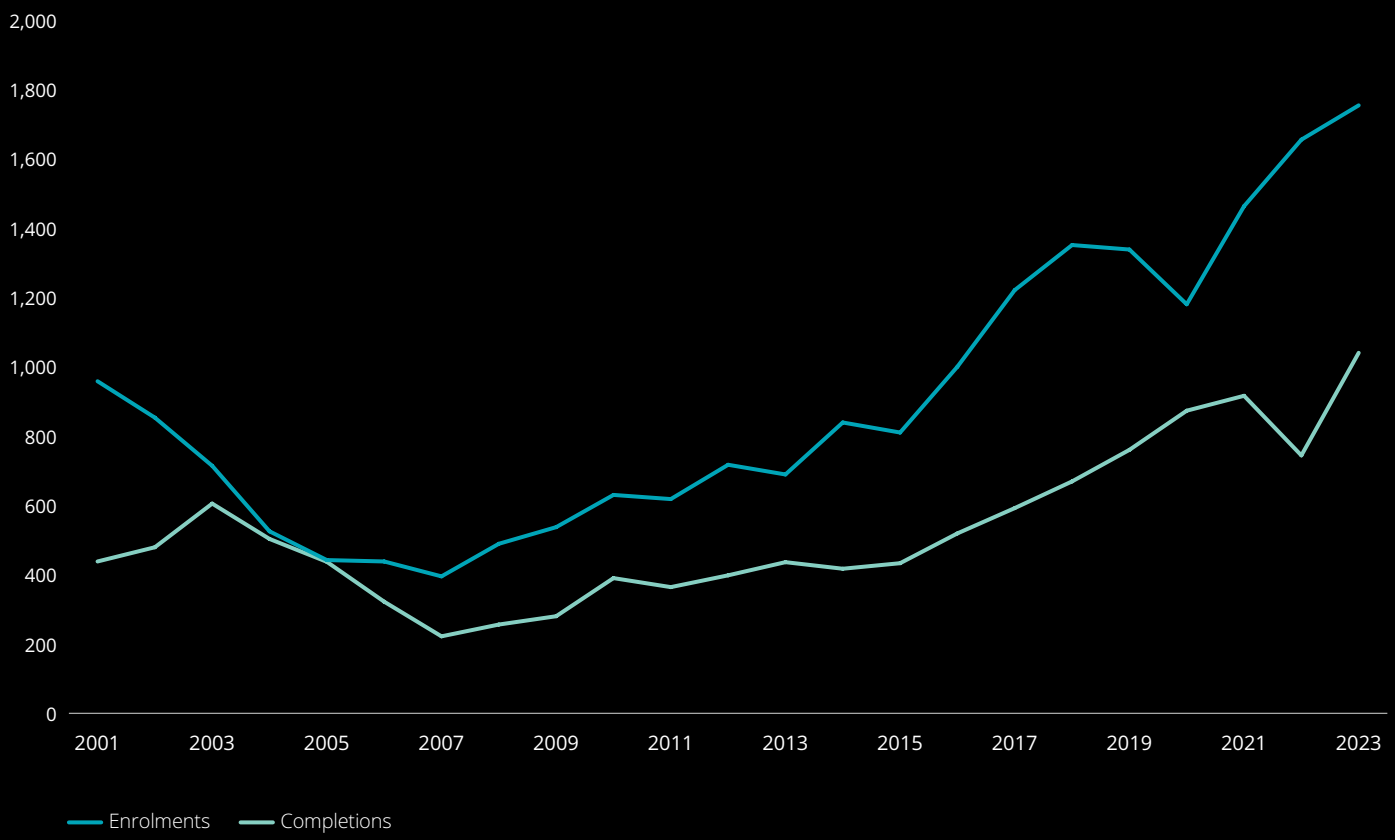
39,600
Technology workers in 2025

+63,300
Technology workers by 2035

1.6 million
Working hours per week spent on digital tasks (40% of work hours)

Education trends

Total enrolments and completions of ICT qualifications in Australian Capital Territory 2001-2023



Statistical compendium

At a glance – Australia

Table A.1: Summary of key national statistics

Indicator	Statistic	Period
Technology workers in Australia	1,012,207	2025
Of which: ICT-related industry subdivisions	467,107	2025
Other industries	545,101	2025
Of which: Technical, professional, management and operational	743,852	2025
Other occupations (trade, sales, other)	268.356	2025
Technology workers' proportion of total workforce	6.92%	2025
Forecast size of technology workforce	1,230,703	2030
Inbound temporary migration of technology workers (457 and 482 visas granted)	2,776	FY23
Net migration inflow of technology workers	12746	FY20
Female share of technology workers	30%	2024
Older workers' (aged 55+) share of technology workers	13%	2024
Businesses' ICT research and development expenditure	7,927,016	FY22
Total ICT service exports	10.57	FY24
Total ICT service imports	6.71	FY24
IT university enrolments by domestic students	19,973	2023
IT university completions by domestic students	9,609	2023
IT university enrolments by international students	49,754	2023
IT university completions by international students	17,320	2022

Table A.2: Summary of key state statistics, 2024

Indicator	NSW	VIC	QLD	SA	WA	TAS	NT & ACT
Technology workers in Australia (2024)	357,788	292,416	153,490	43,063	81,986	10,831	42,755
Of which: ICT-related industry subdivisions	163,307	133,694	61,215	20,864	35,667	5,143	15,629
Other industries	194,481	158,722	92,274	22,198	46,320	5,687	27,126
Of which: Technical, professional, management and operational occupations	255,036	220,510	114,947	29,725	57,949	7,821	34,625
Other occupations (including trades and sales)	102,752	71,906	38,543	13,337	24,037	3,010	8,131
Technology workers' proportion of total workforce (2023)	8.0%	7.8%	5.2%	4.6%	5.1%	3.8%	10.4%
IT university enrolments by domestic students (2022)	7,625	5,336	3,076	1,073	1,981	253	582
IT university completions by domestic students (2022)	3,438	3,011	1,066	468	552	173	408

Statistical compendium

At a glance – Technology employment

Table A.3: CIIER classification of technology workers at the four-digit Australian and New Zealand Standard Classification of Occupations (ANZSCO) level

ICT management and operations
1351 ICT managers
2232 ICT trainers
2247 Management and organisation analysts
2249 Other information and organisation professionals
2621 Database and systems administrators, and ICT security specialists
2632 ICT support and test engineers
ICT technical and professional
2324 Graphic and web designers, and illustrators
2611 ICT business and systems analysts
2612 Multimedia specialists and web developers
2613 Software and applications programmers
2631 Computer network professionals
2633 Telecommunications engineering professionals
3132 Telecommunications technical specialists
2600 ICT professionals NFD
2610 Business and systems analysts, and programmers NFD
2630 ICT network and support professionals NFD
3130 ICT and telecommunications technicians NFD
ICT sales
2252 ICT sales professionals
6212 ICT sales assistants
ICT trades
3131 ICT support technicians
3424 Telecommunications trades workers
Electronic trades and professional*
3123 Electrical engineering draftspersons and technicians*
3124 Electronic engineering draftspersons and technicians*
3423 Electronics trades workers*
ICT industry admin and logistics support*
All other occupations where the employee works in an ICT-related industry subdivision (Telecommunications services; internet service providers, web search portals and data processing services; and computer system design and related services)

* For these occupations, only workers employed in the ICT-related industry subdivisions (telecommunications services; internet service providers, web search portals and data processing services; and computer system design and related services) are counted as technology workers

Sources: ACS and CIIER

Statistical compendium

At a glance – Australia

Table A.4: Technology workers by industry and CIIER occupational grouping, 2024

	ICT management and operations	ICT technical and professional	ICT sales	ICT trades	Electronic trades and professional	ICT industry admin and logistics support	Total technology workers
Industry divisions							
Agriculture, forestry and fishing	623	477	-	1	-	-	1,101
Mining	5,056	4,702	-	1,715	-	-	11,474
Manufacturing	11,386	16,139	230	1,331	-	-	29,086
Electricity, gas, water and waste services	7,544	7,683	1	3,113	-	-	18,341
Construction	2,397	5,020	226	4,430	-	-	12,073
Wholesale trade	4,560	6,142	4,430	1,904	-	-	17,036
Retail trade	11,106	12,810	6,169	3,237	-	-	33,322
Accommodation and food services	1,850	1,293	393	280	-	-	3,817
Transport, postal and warehousing	9,354	7,000	2	1,862	-	-	18,217
Rest of information media and telecommunications*	2,252	7,639	4	746	-	-	10,641
Financial and insurance services	37,708	40,765	313	4,219	-	-	83,005
Rental, hiring and real estate services	2,077	1,362	154	863	-	-	4,455
Rest of professional, scientific and technical services*	68,755	56,105	895	2,834	-	-	128,589
Administrative and support services	3,898	4,298	722	785	-	-	9,702
Public administration and safety	49,320	28,293	595	9,021	-	-	87,230
Education and training	14,251	10,154	282	5,114	-	-	29,800
Health care and social assistance	16,768	5,997	1	4,372	-	-	27,138
Arts and recreation services	3,561	6,323	223	1,005	-	-	11,113
Other services	4,056	3,198	190	3,226	-	-	10,670
ICT industry subdivisions							
Telecommunications services	9,558	14,339	4,343	12,014	713	35,600	76,568
Internet service providers, web search portals and data processing services	1,311	2,476	83	1,046		4,764	9,680
Computer system design and related services	62,912	144,762	18,211	29,297	2,612	91,477	349,271
Total technology workers	**330,302**	**386,976**	**37,469**	**92,415**	**3,325**	**131,841**	**982,328**

Statistical compendium

At a glance – Technology employment

Table A.5: Technology employment forecasts by occupation grouping, 2025 to 2030

Occupation grouping	2025	2030	Average annual growth
ICT management and operations	343,767	445,753	5.3%
ICT technical and professional	400,085	496,959	4.4%
ICT sales	36,488	38,361	1.0%
ICT trades	93,581	101,566	1.7%
Electronic trades and professional	3,383	3,791	2.3%
ICT industry admin and logistics support	134,904	156,690	3.0%
Total	**1,012,207**	**1,243,120**	**4.2%**

Statistical compendium

Technology worker migration

Table A.6: Temporary skilled migration (457 and 482) visa grants for technology occupations, FY15 to FY24

Nominated occupation (ANZSCO Unit Group)	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
1351 ICT managers	939	918	852	524	708	437	258	302	545	374
2232 ICT trainers	10	15	22	16	28	16	13	12	17	16
2247 Management and organisation analysts	1,445	1,345	1,362	990	1,218	974	497	615	1,150	826
2249 Other information and organisation professionals	452	399	350	177	183	171	182	172	286	352
2252 ICT sales professionals	527	531	604	376	557	405	302	328	474	422
2324 Graphic and web designers, and illustrators	472	411	459	220	219	128	115	85	133	134
2611 ICT business and systems analysts	2,098	2,208	2,125	1,709	2,334	1,579	747	1,456	2,499	1,304
2612 Multimedia specialists and web developers	162	133	121	55	106	97	73	154	143	115
2613 Software and applications programmers	5,231	4,984	4,909	3,900	5,241	3,023	3,060	5,242	5,269	3,014
2621 Database and systems administrators, and ICT security specialists	383	385	424		383	267	157	342	488	330
2631 Computer network professionals	272	260	294	257	269	289	145	294	528	303
2632 ICT support and test engineers	767	854	864	829	956	705	665	673	1,180	753
2633 Telecommunications engineering professionals	127	99	81	48	70	71	46	67	94	77
3123 Electrical engineering draftspersons and technicians	351	353	305	177	234	206	155	153	316	418
3124 Electronic engineering draftspersons and technicians	112	91	71							<5
3131 ICT support technicians	320	291	273	143	176	134	101	119	192	215
3132 Telecommunications technical specialists	52	43	79	99	155	75	64	78	157	223
3423 Electronics trades workers	115	80	94	90	168	100	72	113	311	329
3424 Telecommunications trades workers	102	121	117	38	45	18	26	13	24	100
Total ICT 457 visa grants	13,937	13,521	13,406	9,114	1,376	13	6	10	4	
Total ICT 482 visa grants	-	-	-	803	11,874	8,682	6,672	10,178	13,802	9,306
Total visas granted	**13,937**	**13,521**	**13,406**	**9,917**	**13,250**	**8,695**	**6,678**	**10,218**	**13,806**	**9,306**

Statistical compendium

ICT higher and vocational education

Table A.7: Temporary skilled migration (457 and 482) visa grants for technology occupations, FY15 to FY24

	Enrolments		Completions	
Year	**Undergraduate**	**Postgraduate**	**Undergraduate**	**Postgraduate**
2001	12,455	7,346	5,451	2,850
2002	11,574	6,167	6,219	3,294
2003	9,968	5,039	6,580	2,588
2004	8,237	4,030	6,283	2,272
2005	7,028	3,557	5,696	1,976
2006	6,260	3,127	4,672	1,642
2007	5,930	2,926	4,185	1,474
2008	5,659	2,835	3,577	1,349
2009	6,264	3,287	3,159	1,315
2010	6,713	3,312	3,050	1,275
2011	7,361	3,607	3,266	1,353
2012	7,942	4,018	3,339	1,326
2013	8,048	4,038	3,463	1,423
2014	9,098	4,342	3,638	1,468
2015	9,504	4,528	3,949	1,491
2016	9,922	4,664	3,699	1,484
2017	11,529	5,432	4,079	1,544
2018	10,564	5,524	4,375	1,634
2019	10,516	5,970	4,633	1,890
2020	12,239	9,284	5,036	3,083
2021	13,017	10,452	5,384	4,681
2022	13,248	8,135	5,485	3,642
2023	14,281	5,152	6,103	3,506

Statistical compendium

ICT higher and vocational education

Table A.8: International enrolments and completions in IT degrees, 2001 to 2023

	Enrolments		Completions	
Year	**Undergraduate**	**Postgraduate**	**Undergraduate**	**Postgraduate**
2001	8,587	6,482	2,993	3,558
2002	9,010	6,434	4,157	4,821
2003	8,110	5,908	5,659	4,337
2004	7,119	7,829	6,010	3,586
2005	5,905	5,984	5,213	5,428
2006	5,243	4,872	5,021	5,635
2007	5,301	5,116	4,433	4,258
2008	6,116	5,768	3,715	4,369
2009	6,169	6,090	3,851	4,009
2010	6,042	4,815	4,120	5,037
2011	6,024	4,049	3,996	4,528
2012	5,419	4,631	3,749	3,385
2013	5,330	6,105	3,673	3,223
2014	6,034	7,180	3,617	3,573
2015	5,987	6,858	3,516	4,537
2016	7,584	9,004	3,571	5,236
2017	9,527	13,317	4,017	5,604
2018	12,750	19,217	4,984	8,392
2019	15,204	20,752	5,903	12,420
2020	13,607	13,701	7,204	15,855
2021	11,926	8,892	8,134	14,624
2022	17,580	14,150	8,439	8,881
2023	24,116	25,638	8,601	8,259

Table A.9: Government-funded VET subject enrolments in the IT field of education, 2016 to 2023

Field of Education	2016	2017	2018	2019	2020	2021	2022	2023
Diploma or above	27,789	17,957	15,836	18,376	18,092	14,418	12,645	19,282
Certificate IV	10,769	10,863	11,159	12,308	12,974	14,830	14,378	19,602
Certificate III	14,282	14,086	12,924	12,363	12,613	14,534	14,988	17,624
Certificate II	13,307	12,962	10,422	9,732	8,611	6,436	6,372	7,904
Certificate I	16,303	14,756	12,086	11,797	10,183	7,226	91	12

Statistical compendium

Women in technology

Table A.10: Female technology workers by industry, 2024

Industry	Female technology workers	Percentage of female technology workers	Percentage of female workers in all occupations
Agriculture, forestry and fishing	398	36%	31%
Mining	3,121	27%	21%
Manufacturing	8,431	29%	29%
Electricity, gas, water and waste services	4,641	25%	22%
Construction	2,322	19%	13%
Wholesale trade	3,716	22%	33%
Retail trade	11,578	35%	54%
Accommodation and food services	753	20%	53%
Transport, postal and warehousing	5,486	30%	23%
Rest of information media and telecommunications	4,736	45%	39%
Financial and insurance services	26,468	32%	49%
Rental, hiring and real estate services	1,358	30%	42%
Rest of professional, scientific and technical services	46,271	36%	43%
Administrative and support services	3,399	35%	50%
Public administration and safety	34,253	39%	49%
Education and training	9,233	31%	68%
Health care and social assistance	8,885	33%	74%
Arts and recreation services	2,713	24%	45%
Other services	3,119	29%	43%

Statistical compendium

Older technology workers

Table A.11: Older technology workers by CIIER occupation grouping, 2024

	Number of technology workers aged 55+	Percentage of total technology workforce
ICT management and operations	58,782	18%
ICT technical and professional	36,701	9%
ICT sales	3,060	8%
ICT trades	14,823	16%
Total	**113,366**	**13%**

Statistical compendium

ICT research and development & trade

Table A.12: Business expenditure on R&D, FY12 to FY22

	FY12	FY14	FY16	FY18	FY20	FY22
Information and computing sciences	5,496,165	6,073,221	6,634,394	6,747,648	7,092,231	7,927,016
Engineering	8,686,256	7,474,231	5,538,180	4,710,279	5,268,259	5,399,774
Biomedical and clinical services	-	-	-	-	2,190,039	2,949,225
Agricultural, veterinary and food sciences	455,372	553,754	632,619	654,046	1,255,252	1,533,930
Commerce, management, tourism and services	144,273	227,088	152,082	150,551	468,221	496,011
Chemical sciences	425,941	565,758	404,003	431,150	328,353	393,013
Built environment and design	231,743	238,591	166,626	162,413	291,514	447,907
Environmental sciences	281,155	270,044	158,043	170,354	273,188	288,475
Biological sciences	112,724	150,686	88,597	231,970	252,197	344,734
Health sciences	941,159	1,123,956	1,253,415	1,958,471	212,287	250,724
Other fields of research	1,464,642	2,170,273	1,630,943	2,219,625	539,084	608,024

Table A.13: Government expenditure on ICT R&D, FY12 to FY23

	FY12	FY13	FY15	FY17	FY19	FY21	FY23
Commonwealth ICT R&D expenditure ($'000)	$3,144,370	$240,828	$247,462	$254,504	$262,306	$331,068	$430,392
Commonwealth ICT share of R&D expenditure	13%	10%	11%	12%	12%	14%	15%
State and territory ICT R&D expenditure ($'000)	$8,596	$12,778	$20,882	$38,627	$2,496	$4,489	$11,940
State and territory ICT share of R&D expenditure	1%	1%	2%	3%	0.2%	0.4%	0.8%

Table A.14: Exports and imports of ICT services, FY13 to FY24 ($bn)

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Exports	1.91	2.08	2.50	2.78	2.93	3.60	4.36	4.99	5.09	6.43	8.02	10.57
Imports	1.87	2.50	2.59	2.88	2.74	3.14	3.72	4.67	4.43	4.99	6.03	6.71

Statistical compendium

Detailed state figures

Table A.15: State breakdown of technology workers by industry, 2024

Industry Divisions	NSW	VIC	QLD	SA	WA	TAS	ACT*	NT*
Agriculture, forestry and fishing	396	95	118	139	130	81	N/A	N/A
Mining	713	1,124	3,456	552	5,445	75	N/A	N/A
Manufacturing	10,585	9,337	5,287	1,500	2,087	146	N/A	N/A
Electricity, gas, water and waste services	4,416	6,375	3,633	619	2,651	211	N/A	N/A
Construction	5,780	2,964	1,358	696	916	165	N/A	N/A
Wholesale trade	8,525	4,984	1,281	522	1,418	141	N/A	N/A
Retail trade	13,208	12,960	4,216	593	1,741	167	N/A	N/A
Accommodation and food services	1,427	368	1,766	114	6	-	N/A	N/A
Transport, postal and warehousing	6,892	6,717	3,288	421	769	1	N/A	N/A
Rest of information media and telecommunications	4,451	3,081	2,123	329	224	34	N/A	N/A
Financial and insurance services	40,041	30,284	5,511	1,821	4,606	263	N/A	N/A
Rental, hiring and real estate services	2,061	1,218	907	1	1	1	N/A	N/A
Rest of professional, scientific and technical services	47,726	36,574	20,117	5,952	11,786	1,193	N/A	N/A
Administrative and support services	2,761	1,906	3,782	483	410	121	N/A	N/A
Public administration and safety	22,951	17,269	16,739	4,564	7,135	1,983	N/A	N/A
Education and training	9,667	6,907	7,741	1,711	2,072	580	N/A	N/A
Health care and social assistance	5,720	9,395	6,294	1,369	3,600	294	N/A	N/A
Arts and recreation services	3,228	3,764	2,544	391	744	135	N/A	N/A
Other services	3,933	3,400	2,111	420	579	98	N/A	N/A
ICT industry subdivisions								
Telecommunications services	24,694	27,888	10,685	3,638	6,463	1,541	N/A	N/A
Internet service providers, web search portals and data processing services	2,430	3,659	1,191	397	1,353	377	N/A	N/A
Computer system design and related services	136,183	102,147	49,339	16,828	27,851	3,225	N/A	N/A
Total technology workers	**357,788**	**292,416**	**153,490**	**43,063**	**81,986**	**10,831**	**N/A**	**N/A**

Statistical compendium

Detailed state figures

Table A.16: New South Wales employment forecasts by CIIER occupation grouping, 2025 to 2030

	2025	2030	Change	Average annual growth rate
ICT management and operations	119,336	167,233	47,898	7.0%
ICT technical and professional	147,245	178,227	30,982	3.9%
ICT sales	15,873	17,325	1,452	1.8%
ICT trades	34,049	39,502	5,453	3.0%
Electronic trades and professional	669	759	90	2.6%
ICT industry admin and logistics support	54,100	64,722	10,622	3.6%
Total technology workers	**371,271**	**467,768**	**96,497**	**4.7%**

Table A.17: Victoria employment forecasts by CIIER occupation grouping, 2025 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	104,999	126,054	21,054	3.7%
ICT technical and professional	121,497	150,806	29,310	4.4%
ICT sales	11,034	11,844	810	1.4%
ICT trades	24,396	24,393	-4	0.0%
Electronic trades and professional	1,028	1,261	234	4.2%
ICT industry admin and logistics support	37,435	38,886	1,451	0.7%
Total technology workers	**300,389**	**353,244**	**52,855**	**3.3%**

Table A.18: Queensland employment forecasts by CIIER occupation grouping, 2024 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	55,758	65,818	10,060	3.4%
ICT technical and professional	61,889	72,269	10,379	3.1%
ICT sales	5,058	4,926	-132	-0.5%
ICT trades	15,462	17,252	1,790	2.2%
Electronic trades and professional	1,025	990	-34	-0.7%
ICT industry admin and logistics support	19,878	20,014	136	0.1%
Total technology workers	**159,070**	**181,269**	**22,200**	**2.6%**

Table A.19: South Australia employment forecasts by CIIER occupation grouping, 2024 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	11,897	21,159	9,262	12.2%
ICT technical and professional	16,841	23,204	6,363	6.6%
ICT sales	1,318	1,180	-138	-2.2%
ICT trades	5,106	4,944	-162	-0.6%
Electronic trades and professional	2	3	1	8.7%
ICT industry admin and logistics support	5,672	11,436	5,764	15.0%
Total technology workers	**40,836**	**61,926**	**21,090**	**8.7%**

Statistical compendium

Detailed state figures

Table A.20: Western Australia employment forecasts by CIIER occupation grouping, 2024 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	28,448	33,835	5,386	3.5%
ICT technical and professional	31,785	43,566	11,781	6.5%
ICT sales	2,215	2,138	-77	-0.7%
ICT trades	9,231	9,409	178	0.4%
Electronic trades and professional	414	382	-32	-1.6%
ICT industry admin and logistics support	12,674	14,906	2,231	3.3%
Total technology workers	**84,767**	**104,235**	**19,468**	**4.2%**

Table A.21: Tasmania employment forecasts by CIIER occupation grouping, 2024 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	4,289	6,328	2,039	8.1%
ICT technical and professional	3,764	5,824	2,060	9.1%
ICT sales	206	140	-66	-7.4%
ICT trades	1,446	2,119	673	7.9%
Electronic trades and professional	62	191	128	25.1%
ICT industry admin and logistics support	1,406	989	-417	-6.8%
Total technology workers	**11,173**	**15,590**	**4,418**	**6.9%**

Table A.22: Northern Territory employment forecasts by CIIER occupation grouping, 2024 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	2,259	3,087	827	6.4%
ICT technical and professional	1,664	2,247	584	6.2%
ICT sales	110	121	11	1.9%
ICT trades	583	599	16	0.5%
Electronic trades and professional	58	66	8	2.7%
ICT industry admin and logistics support	439	651	212	8.2%
Total technology workers	**5,112**	**6,771**	**1,658**	**5.8%**

Table A.23: Australian Capital Territory employment forecasts by CIIER occupation grouping, 2025 to 2030

	2025	2030	Change	Average annual growth rate (%)
ICT management and operations	16,780	22,239	5,459	5.8%
ICT technical and professional	15,400	20,816	5,416	6.2%
ICT sales	675	687	12	0.4%
ICT trades	3,308	3,348	41	0.2%
Electronic trades and professional	126	139	13	2.0%
ICT industry admin and logistics support	3,300	5,087	1,786	9.0%
Total technology workers	**39,589**	**52,317**	**12,727**	**5.7%**

Statistical compendium

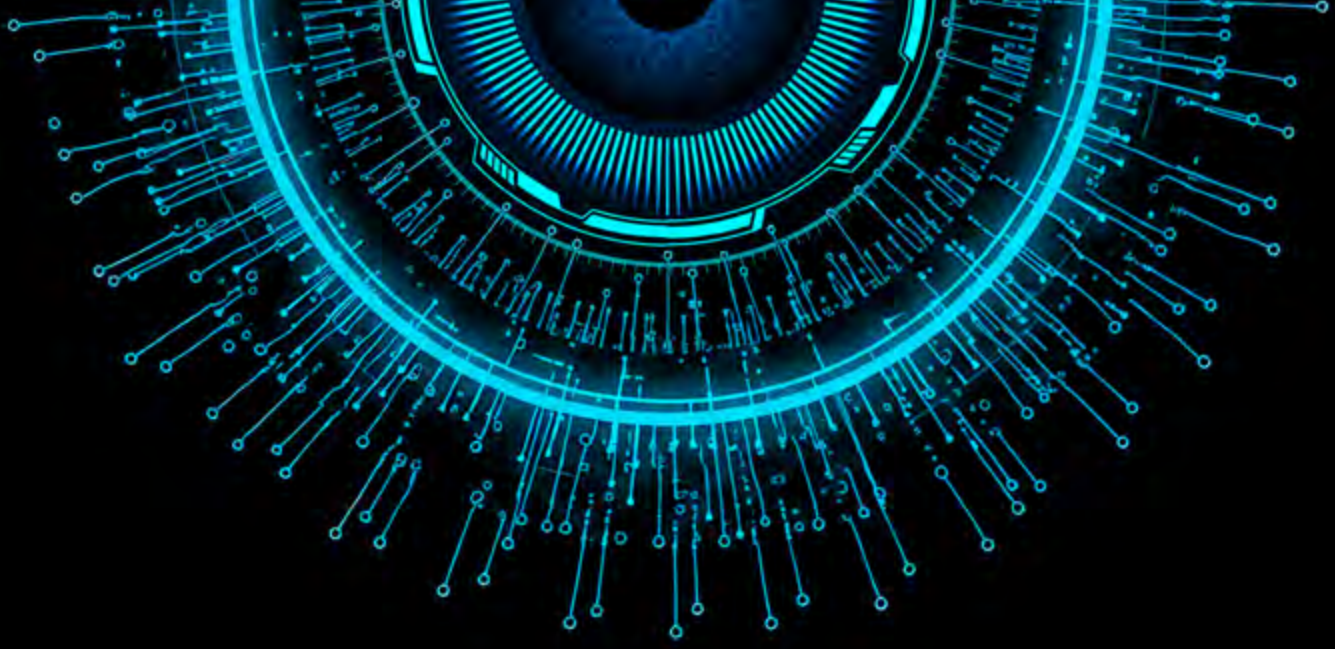
Detailed state figures

Table A.24: State breakdown of domestic enrolments and completions in IT degrees, 2023

	Enrolments		Completions	
State	**Undergraduate**	**Postgraduate**	**Undergraduate**	**Postgraduate**
New South Wales	5,799	1,826	2,428	1,304
Victoria	3,532	1,804	1,733	1,252
Queensland	2,040	1,036	821	380
Western Australia	894	179	298	254
South Australia	1,763	218	432	173
Tasmania	248	5	117	8
Northern Territory	24	0	12	11
Australian Capital Territory	474	84	239	124

Table A.25: State breakdown of international enrolments and completions in IT degrees, 2023

	Enrolments		Completions	
State	**Undergraduate**	**Postgraduate**	**Undergraduate**	**Postgraduate**
New South Wales	8,325	7,862	3,078	2,527
Victoria	8,929	9,684	3,338	3,053
Queensland	1,648	2,716	542	926
Western Australia	2,524	1,708	610	268
South Australia	1,536	2,117	472	845
Tasmania	355	230	214	159
Northern Territory	287	465	55	66
Australian Capital Territory	384	812	271	406
Multi-state	128	44	21	9



Appendix B

Technical appendix

B.1 | Deloitte workforce survey

Survey methodology and demographics

This report's analysis has been informed by a workforce survey fielded in April 2025, receiving 1,224 responses in total.

The survey focused on two groups:

- Technology workers
- Non-technology worker

Given the focus on these groups, individuals that were under 18 were excluded from the survey.

The survey was fielded to respondents sourced through the market research firm Dynata and emails to ACS members and subscribers to ACS publications.

The aim of the survey was to investigate digital skills in the workforce, reskilling into technology, and alternative pathways into technology roles.

Demographics:

Gender

Of the 1,224 survey respondents, 679 identified as male (55%), 541 identified as female (44%) and 4 identified as another gender, including non-binary (total of 0.4%).

Age

The highest number of survey responses came from the 35–44 age group, with 304 respondents This was followed by the 45–54 age group (269 responses) and the 25–34 age group (262 responses).

Figure B.1: Survey sample proportion of technology workers to non-technology workers

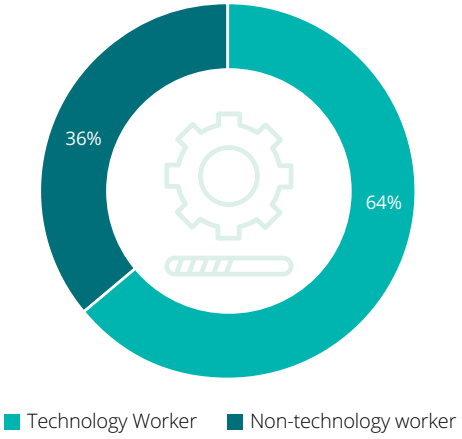


Figure B.3: Survey sample proportion of responses provided by Dynata and ACS

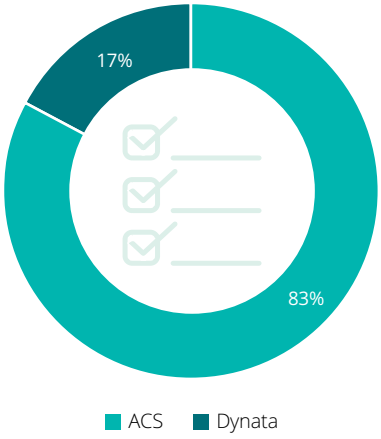


Figure B.2: Survey sample proportion by gender

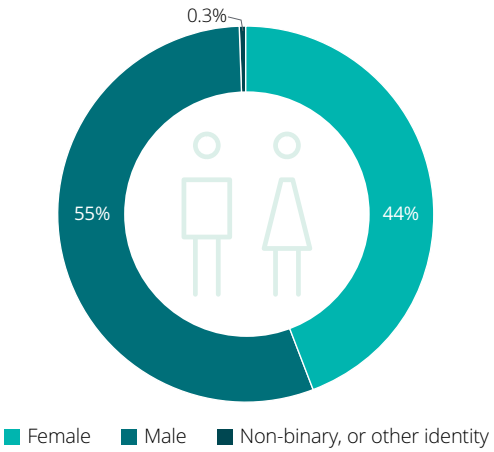
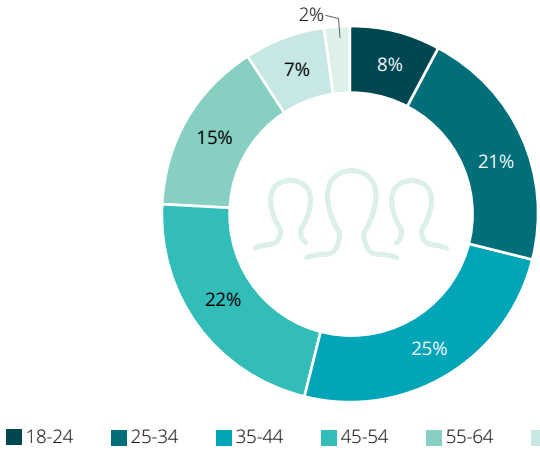


Figure B.4: Survey sample proportion by age



B.2 | Deloitte leadership survey methodology

Survey methodology and demographics

This report's analysis has been informed by a leadership survey fielded in April 2025, receiving 310 responses.

The survey focused on two groups:

- Chief Executive Officers (CEO) or Directors with similar duties
- Chief Financial Officers (CFO) or Directors with similar duties
- Chief Operations Officers (COO) or Directors with similar duties.

Given the focus on these groups, individuals who did not fall within categories, or were under 18 were excluded from the survey.

The survey was fielded to respondents sourced through the market research firm Dynata.

The aim of the survey was to investigate digital skills in leadership, digital skills across organisations, and pathways for technology talent.

Demographics:

Gender

Of the 310 survey respondents, 217 identified as male (70%) and 93 identified as female (30%).

Business size

The spread of respondents was relatively even among business size, with the largest proportion being part of businesses with 250-999 employees (24%). The smallest proportion of respondents came from business sizes of 11-49 employees (12% of the sample).

Figure B.5: Survey sample proportion by position

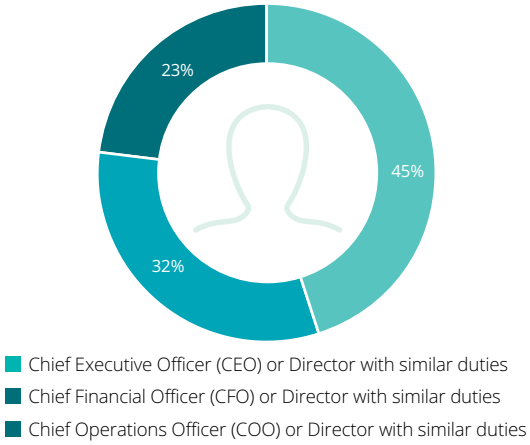


Figure B.6: Survey sample proportion by gender

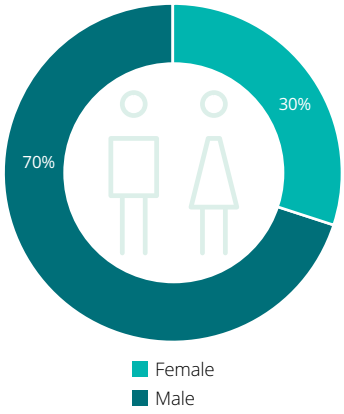
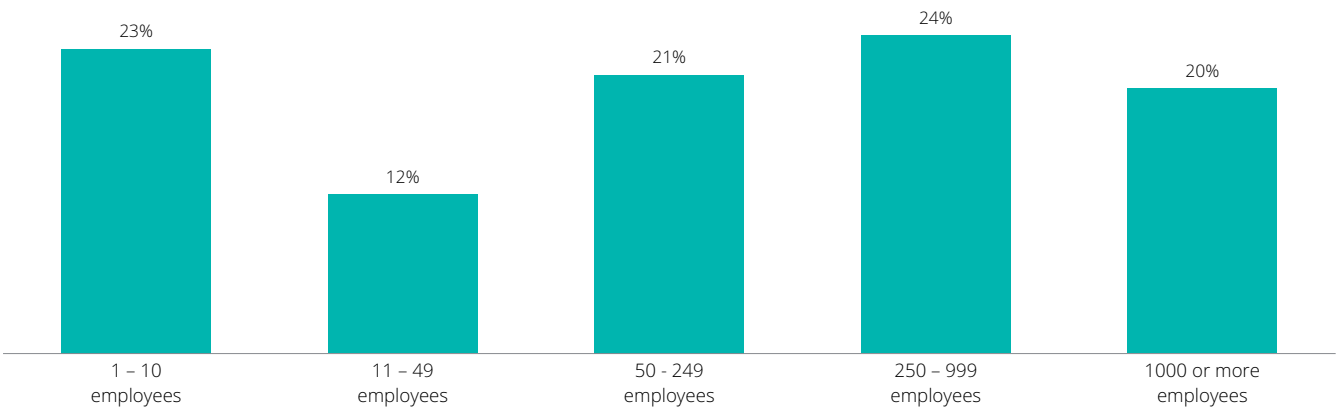


Figure B.7: Survey sample proportion by business size



B.3 | Estimating the cost of cyberattacks

Methodology and sources

Analysis on the cost of cyberattacks has been informed using data from the Australian Signals Directorate (ASD), the Australian Institute of Criminology (AIC), the Australian Bureau of Statistics (ABS) and other sources.

These costs focusued on two groups:

- Costs to businesses
- Costs to individuals.

This analysis aims to estimate the annual cost of cyberattacks to the Australian economy by using publicly available data to highlight the opportunity cost to be saved by strengthening Australia's cyber defences.

Costs for business

Costs for businesses responding to attacks are estimated at $59 billion. This estimate is based on the average costs of a typical cyberattack for small ($49,600), medium ($62,800) and large ($63,600) business from the Australian Signals Directorate[1] and the prevalence rate of 22% of businesses reporting harm to their business from cybercrime in 2023, as reported by the Australian Institute of Criminology.[2] Costs are applied to the population of small, medium and large businesses reported by the ABS in 2024.[3]

Forecast spend on cybersecurity defences by Australian businesses is then added, based on Gartner's projection that Australian businesses will spend $6.2 billion on information security and risk management products and services in 2025.[4]

The wages of cybersecurity professionals are then included, taking 137,453 cyber professionals employed in 2024 reported in State of Industry[5] and an average wage per cybersecurity professional of $120,000 reported by USYD.[6]

Costs for individuals

The costs of cyberattacks to individuals are estimated at $4 billion per year.

This estimate is calculated by taking the average cost of $987 per individual report published by the Australian Signals Directorate in 2019, based on a survey of 11,800 individuals.[7]

These costs are then multiplied by the share of individuals who experienced a cyberattack in 2023, as reported by the AIC (22%).[8] This cost is then applied to the number of over 18s living in Australia in 2024, as reported by ABS, approximately 21,100,000.[9]

These figures were then internally quality assured by Deloitte Access Economics and tested with internal peers working in the technology and cyber risk fields.

How this approach compares to other estimates

This report builds upon previous attempts to estimate the costs of cyberattacks to the Australian economy. To inform the approach, we conducted a literature review of other costings.

Two other annual figures for cybercrime costs to the Australian economy were identified and reviewed including $30 billion a year from CyberCX[10] and $42 billion a year from a SuretyIT.[11] Neither source provides substantial detail on the methodology or sources informing the estimates.

Therefore, this report presents a new and defensible estimate of the annual costs of cyberattacks to the Australian economy, informed by robust publicly available estimates.

Figure B.8: The annual cost of cyberattacks to the Australian economy

Source: Deloitte Access Economics calculations (2025)

B.4 | Estimating the economic uplift of closing digital skill gaps

Background and context

This report utilises economic literature on the relationship between technology adoption and economic output, incorporating considerations of how firm-level skills gaps moderate the transmission of technology adoption to growth.

Impact of technology on economic output

A number of studies have attempted to quantify the relationship between various forms of ICT and economic output or growth to observe how changes in ICT impact economic growth.[12] In this context a large body of literature focusses on more discrete forms of ICT, digital technologies and connectivity, such as internet access, broadband penetration and mobile connectivity, consistently finding a positive relation with economic growth.

For example, looking at 21 OECD countries from 1970-1990, Roller and Waverman (2001) assessed the impact of telecommunication infrastructure on economic growth finding elasticities ranging from 0.034-0.154%, indicating a 1% increase in telecommunication infrastructure was assisted with a 0.034-0.154% increase in economic growth, with a central estimate of 0.045%.[13] Koutroumpis (2009a) and Koutroumpis (2009b) assessed the relationship between broadband penetration and economic growth across 22 OECD countries over the period 2002-2007 and 15 EU countries over 2003-2006, respectively.[14, 15] These papers identified output elasticities of 0.012-0.025% and 0.026-0.085%, respectively. Similarly, in an analysis of broadband infrastructure and economic growth across 25 OECD countries in 1996-2007, Czernich et al. (2019) find a 1% increase in broadband penetration is associated with growth in annual GDP per capita in the region of 0.09-0.15%.[16] Katz & Callorda (2018) assessed the link between mobile broadband penetration and changes in GDP per capita across 139 countries between 2004-2017, estimating a per capita output elasticity of 0.150%.[17]

Other papers have looked at output elasticities of ICT capital, focussing on the role of ICT capital's role as a factor of production, alongside labour and non-ICT capital inputs. These studies have consistently found that ICT has a positive impact on output and further has a considerable excess return compared to the income share of ICT. Academic literature assessing the link between ICT capital stocks or services have been conducted primarily focussing on the US, EU and across OECD countries. Such papers have estimated elasticities of ICT capital with economic output ranging from 0.03-0.14.[18] In other words, a 1% increase in ICT capital is typically estimated to be associated with between a 0.03-0.14% increase in economic growth.

Analysing a sample of 59 countries over the period 1995-2010, Niebel (2014) estimates output elasticities of ICT capital services in the range of 0.066-0.100% employing a regression of an augmented Cobb-Douglas production function.[19] Similarly, Tsachtsiris et al. (2022) attempt to estimate the elasticity of ICT investments with economic growth across 27 countries within the European Union over 1996-2006, producing elasticities ranging from 0.087-0.139% depending on the model employed.[20]

Further, Venturini (2009) attempts to estimate the impacts of ICT capital from a long-run perspective across the US and 13 EU member states from 1980-2004 using a panel co-integration methodology. Elasticities varied according to the estimation model used returning elasticities from 0.056-0.138%.[21]

Some studies have found more moderate estimates, however. Spezia (2013) estimates an elasticity of ICT capital to value added of 0.056%, in a regression across 25 EU member states, Australia, the US and Japan for the period 1970-2007.[22] Hanclova et al. (2015) assess 14 older EU member countries and 7 newer members across two time periods 1994-2000 and 2001-2008.[23] They find that the impact of ICT capital services was significantly higher (0.086%) amongst newer member states compared to older ones (0.031%).

The impact of skills on technology adoption and use

Advances data sources enabled research to extend beyond economic aggregates to assess the impact of technology adoption at the firm-level. For example, Gal et al (2019) finds that, for a panel of 19 EU countries, a 10-percentage point increase in industry-level adoption of digital technologies such as high-speed broadband, customer relationship management software and cloud computing translate into an instantaneous increase in multifactor productivity growth of between 0.9 and 1.9 percentage points.[24]

Gal et al (2019) also finds that the of technology adoption on growth is significantly moderated by the presence of skills shortages for gaps including resource management, computer and electronics, and technical skills. They find an average 30% increase in the benefit of digital technology adoption for firms in the 75th percentile of the skill shortage distribution compared to the miedian and 25th percentile firm.

Relatedly, Andrews et al (2018) finds that increasing the percentage of low-skilled workers that receive training by one standard deviation is associated with a 3 percentage points increase in the share of firms adopting CRM or cloud computing systems in knowledge-intensive relative to other industries.[25]

There are limited Australian specific studies assessing the impact of skills on technology adoption and use but the existing body of research does support a positive relationship. For example, Nguyen and Hambur (2023) finds that firms with directors with strong technical backgrounds (experience with relevant technologies) are far more likely to adopt the technologies and to increase their profitability post-adoption. Adopting firms are also more likely to try to hire workers with GPT-related skills, indicating adoption is associated with increased demand for relevant skills.[26]

B.4 | Estimating the economic uplift of closing digital skill gaps

Methodology and sources

Methodology

A high-level outline of the methodology which puts together the economic literature on ICT and skills is provided below. The process involves:

1. Estimating the historic and projected level of net ICT capital stock (i.e., IT hardware and equipment, software, databases etc.) for Australia. Historic data is sourced form the OECD Stand Database while projected net ICT capital stocks are calculated based on applying a constant share of net ICT capital to GDP (~9.1%). This share reflects the average of final year of historical estimates.
2. The base case impact of technology on GDP is estimated using the relationship between ICT capital and GDP from the literature, with an elasticity of 0.1 used to estimate the contribution of net ICT capital stocks to changes in observed and forecast GDP. That is, a 1% increase in the net ICT capital stock is associated with a 0.1% increase in economic growth.
3. The additional benefit under the 'low-skill gap' case is estimated by considering the additional GDP benefit of net ICT capital if all firms possessed skills gaps at the 75% percentile of the skill gap distribution from Gal et al (2019). Outlined in Table B.1 this calculated by considering the weighted average benefits of technology adoption (proxied by high-speed broadband) on MFP growth. The scenario implies an average increase in the benefits of technology adoption of 30% for high- and moderate-skill gap firms and 20% increase in the average elasticity across all firms. Applying this increase to that of net ICT capital implies that an increase in the elasticity from 1.0 in the base case to 1.2 in the low-skill gap case.
4. The increase in GDP associated with the low-skill gap scenario is calculated through two channels:
    a. The net increase in GDP associated with improved use of future technology (i.e., the increase in future net ICT capital stocks), calculated as the net difference between contribution of future growth in ICT capital stocks under an elasticity of 1.0 and 1.2.
    b. The net increase in GDP associated the better use of the existing ICT capital stock calculated by considering the benefits that could have been reaslised if past increases in net ICT capital was adopted under a low-skill scenario. Recognising that not all previous ICT capital is still in use, the total foregone benefit subtracting the share of capital that is estimated have depreciated (~75%).

Discussion

Iteratively applying this process over time provides an additional impact of technology on GDP of $24.7 billion by 2035, comprised on a $16.8 billion uplift from the better use of newly adopted technology and $7.9 billion from better use of the existing capital stock (Figure B.9). This impact may be conservative as it does not account any impact of improved digital skills on technology adoption itself.

There are several key limitations inherent in this approach including that, while there is a positive relationship between smaller skill gaps and the benefits of technology, this relationship may diminish as a higher share of firms reduce their gaps. Much of the research utilise is based on EU data which, while similar to the Australian context, does differ in the baseline level of technology use and adoption.

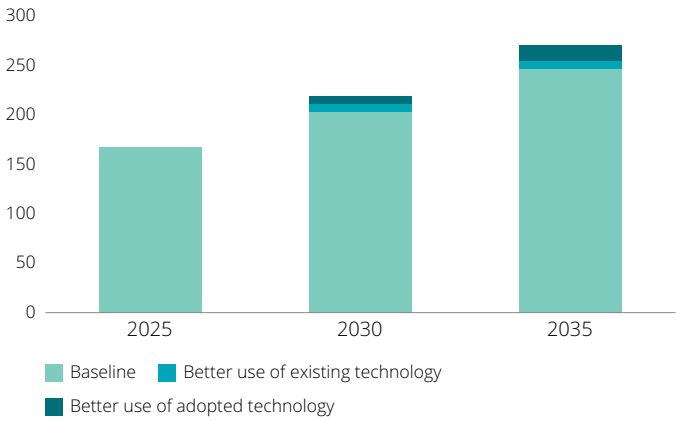
Closing skills gaps is also no costless with investment from businesses, government and individual needed, and the effort required to reach the scenario modelling likely to impact other areas of the economy.

Table B.1: Skills uplift assumptions

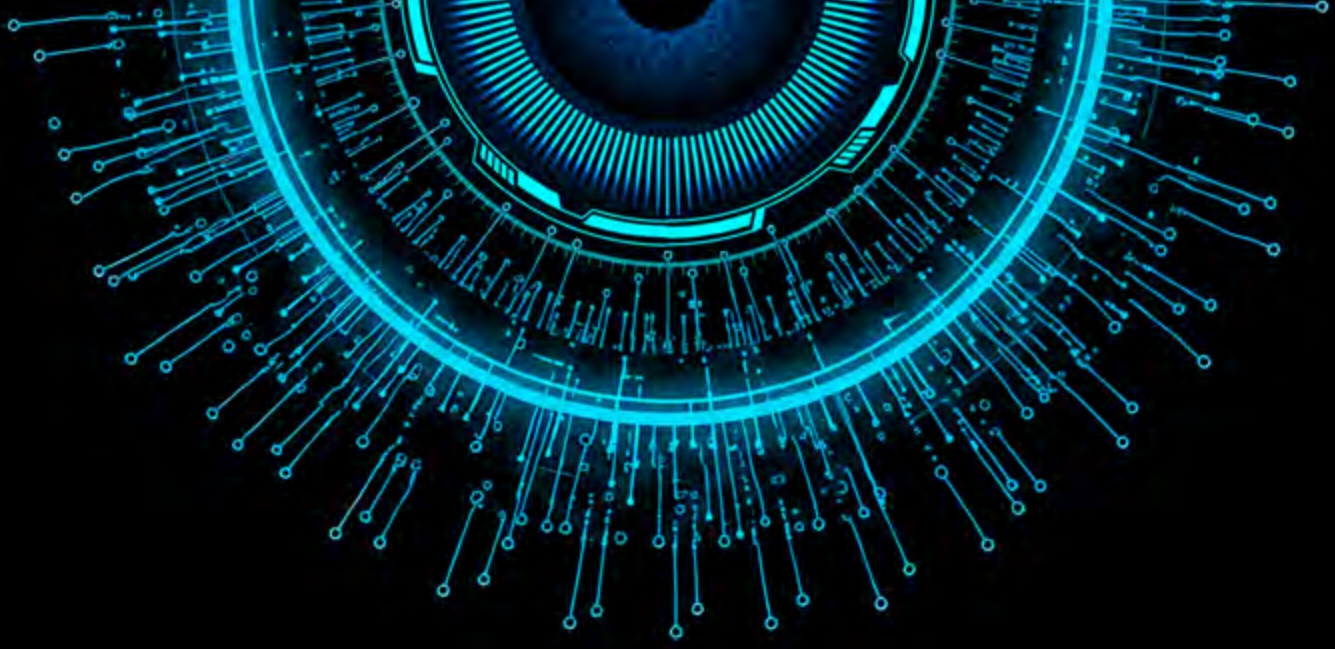
	Benefit of technology	Share of firms (base case)	Share of firms (low-skill gap case)
High-skill gap	1.4	25%	0%
Moderate-skill gap	1.6	50%	0%
Low-skill gap	2.0	25%	100%
Weighted average	-	1.7	2.0

Source: Deloitte Access Economics (2025)

Figure B.9: Economic impact of more skilled technology use, $ billion



Source: Deloitte Access Economics (2025)



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Appendix B | Technical appendix

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