

# Meeting the AI Skills Boom

June 2024



This report was prepared by the Tech Council of Australia and sponsored by Microsoft, LinkedIn and Workday.

## About the Tech Council of Australia

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

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

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# EXECUTIVE SUMMARY

## The AI jobs opportunity<sup>1</sup>

**As the development and adoption of Artificial Intelligence (AI) technologies continues apace, so does demand for workers with relevant skills. We forecast that AI has the potential to create up to 200,000 jobs in Australia by 2030, which will need to be met through a combination of entry-level training, upskilling of existing workers and mid-career retraining.**

These jobs include tech jobs and non-tech jobs that are directly related to building and scaling AI systems. This breadth of jobs reflects the reality of successfully building and scaling new technologies. While tech roles in engineering and product management are essential to building new technology products and systems, we also need people in areas like human resources, sales and legal/governance to successfully scale and manage these products and systems.

Meeting this jobs opportunity would enable greater development and adoption of AI in Australia and billions of dollars in additional economic benefits. Greater adoption of Generative AI alone could contribute an annual economic benefit of \$115 billion under a fast-paced adoption scenario. A large majority (70%) of this economic benefit comes from productivity gains.



This could be the much-needed boost to productivity that is required to reverse Australia's stagnant productivity growth.

Australia's AI workforce has grown remarkably in recent years, from around 800 workers in 2014 to over 33,000 in 2023. This report investigates whether this growth trajectory can continue to meet the high demand expected by 2030. While many occupations that could be pathways into AI jobs are growing fast, this growth is unlikely to be fast enough to meet the potential ~500% increase in AI jobs between now and 2030.



## Key Findings - AI Occupations

### Developing Occupations

These occupations include tech roles, such as engineering, data science and cybersecurity, that are required to build and operate AI systems. While we forecast fast growth in supply across these occupations, they're unlikely to grow as fast as demand. This will result in shortages. Greater expansion of mid-career retraining pathways operating at scale and targeted use of skilled migration will enable us to fully meet the demand in these occupations.

### Scaling Occupations

Roles in sales, marketing, finance, and human resources are required to scale AI systems. With these roles currently in shortage, we may face difficulties in rapidly expanding the share of these people working in tech. Encouragingly, many of these occupations have relatively flexible training pathways with higher uptake of VET training.






### Governing Occupations


Legal, policy, and compliance roles are critically important for managing AI responsibly and meeting regulatory compliance. These areas are experiencing growth but may face challenges due to the inflexible nature of current training pathways, a limited pool of experienced candidates and the degree of job requirement change. Expanding the pathways into these roles for Australians and supporting targeted skilled migration to build currently-niche skillsets in this area will be essential to meeting strong demand.

### Managing Occupations

There is strong emphasis on upskilling senior management to navigate the complex landscape of AI integration. In addition to skilling, leaders need the right kinds of experience in applying these skills. Global tech firms and skilled migration are also important pathways to bring in experienced leaders in these areas to coach and nurture emerging leaders.



## Recommendations

- 1. Expand and diversify retraining pathways:** Enhance VET and short-course offerings to quickly adapt to changing skills demands across AI jobs and ensure they remain industry-relevant. This should include expanding existing offerings that have proven effective, co-designing new pathways or offerings with industry, embedding industry credentials / training where appropriate, and implementing Modern Digital Apprenticeship programs at federal and state levels. Diversifying pathways is particularly important for people retraining mid-career into areas with greater expected shortages and larger skills changes such as Engineering and will be instrumental in improving diversity in the tech workforce.  
- 2. Promote awareness of AI jobs and skills needs:** While it's essential to understand and address the potential impacts of AI on current occupations, we need to have an equal focus on ensuring domestic supply of AI-skilled workers meets demand in the economy to avoid future labour market shortages. This requires us to enhance awareness of the job opportunities AI creates and support Australians to understand training and career pathways. 
- 3. Promote AI literacy across the workforce:** Support widespread training initiatives to boost AI literacy across the workforce, ensuring that the workforce is prepared for a future where AI adoption is widespread. This needs to include action to upskill senior management in AI governance and adoption.  

**Reform skilled migration:** The skilled migration reforms underway are crucial to ensuring that we can competitively attract global talent with faster visa processing and the removal of occupation lists. The removal of occupation lists will be particularly impactful for the AI workforce, in which many occupations may emerge much faster than official statistical systems can keep up. 

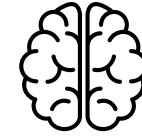
**Develop a comprehensive AI Investment and Capability Plan for Australia:** the development of specific skills-based initiatives should be undertaken as part of a broader and more comprehensive plan to grow AI capability in Australia. Such a plan should also include measures around investment, regulation and governance, digital infrastructure, research and commercialisation and positioning governments as an exemplar.  

### KEY

-  **Government role**
-  **Industry role**

This key reflects where government and/or industry have a substantial role to play in the recommended initiatives. This highlights the importance of strong government-industry collaboration in supporting growth of the AI workforce.

## The AI Jobs Opportunity



## Developing Occupations



## Scaling Occupations



## Governing Occupations



## Managing Occupations



## Summary & Recommendations

## Appendices

## Australians are rapidly adopting AI with over 84% of knowledge workers already using AI at work

Knowledge workers include those who typically work at a desk (whether in an office or at home). AI products currently available, such as CoPilot for Microsoft 365, ChatGPT and Gemini, are well-suited to common tasks across knowledge worker occupations such as drafting documents or undertaking data analysis.

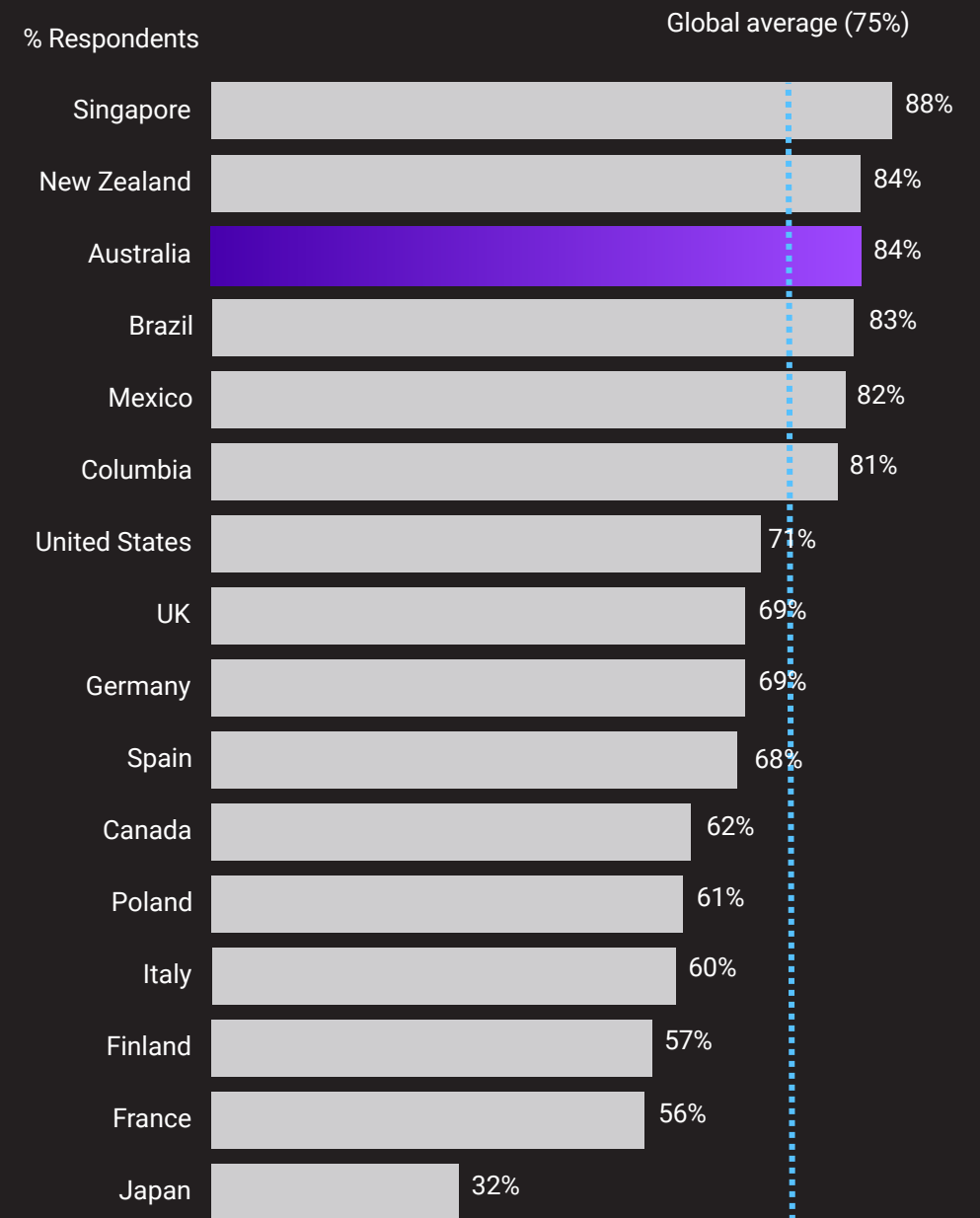
Many more workers across the economy are also beginning to use AI-powered tools at work. For instance, Xero provides cloud-based accounting software that enables small businesses to adopt AI-powered cash flow forecasting. AI adoption is also helping make workplaces safer with SafetyCulture’s app allowing users to create tailored inspection checklists and create engaging micro-learning courses in minutes.

People using AI at work report that it helps them save time (90%), focus on their most important work (85%), become more creative (84%) and enjoy their work more (83%).

Greater uptake of Generative AI could contribute up to \$115 billion annually in economic benefit to the Australian economy under a high-adoption scenario. A large majority (70%) of this economic benefit comes from productivity gains. This could provide a much-needed boost to help address Australia’s stagnant productivity growth.

Note: Knowledge workers include those who those who typically work at a desk (whether in an office or at home). This group includes those who are in person or working remotely in some capacity Source: [Microsoft and LinkedIn \(2024\) 2024 Work Trend Index Annual Report](#); Microsoft & Tech Council of Australia (2023) Australia’s Generative AI opportunity

## Knowledge workers reporting using Generative AI at work



## Greater development and adoption of AI will increase demand for workers with these skills

Australians are becoming quick adopters of AI, using it to find jobs faster, improve team cohesion at work and learn new skills

Businesses are also becoming fast adopters of AI, using it manage financial transactions, cash flow forecasting and improve their cybersecurity

### Recruitment



There are a range of applications of AI in recruitment. For instance, LinkedIn is using AI to help users more effectively connect to opportunities, showcase their expertise and skills and gain access to the knowledge they need to do their jobs.<sup>1</sup> LinkedIn's AI-powered tools are also helping recruiters find top talent through faster, AI-assisted sourcing and improved matching based on a 'skills-first' approach.<sup>2</sup>

### Human Resources



Workday AI's capabilities can augment the capacity of the workforce and empower the modern-day worker by automating repetitive business processes and reducing the drudgery of these tasks. Workday's generative AI capabilities can produce job descriptions in minutes, perform contract analysis, and develop bespoke employee growth plans. This allows employees to focus on higher value and more strategic tasks like building trusted relationships with their colleagues.

### Teamwork



AI can help improve teamwork within organisations. For example, Atlassian builds enterprise software products to help teams collaborate. The Atlassian Intelligence platform brings AI to Atlassian's full family of cloud products, empowering team members by improving productivity, driving automated actions and providing accessible insights on how teams work together.

### Education



Many young Australians are using AI to help support their education. According to Year 13 research, almost 60% of young Australians have used AI for education purposes, such as summarising content, conducting research and improving their writing skills. A large share (70%) of young Australians believe AI will play an important role in their future education and career.<sup>3</sup>

### Financial Services



Financial services are increasingly looking to AI to improve their operations. For instance, Stripe, a financial infrastructure platform for businesses, uses AI to help companies secure their payments and transactions and manage fraud. Drawing upon thousands of signals from across the Stripe network, Stripe uses adaptive machine learning to evaluate transactions for fraud risk.

### Cybersecurity



There is an important role for AI in promoting cyber-resilience in organisations. For instance, Microsoft delivers a range of AI cybersecurity solutions such as Microsoft Copilot for Security.<sup>1</sup> The tool allows security teams to use natural language queries to identify risks and investigate incidents. Security professionals with Copilot are estimated to work 22% faster and 7% more accurately.<sup>2</sup>



## AI development and adoption in Australia could create up to 200,000 jobs by 2030

### Australia's AI workforce has been growing rapidly from a small base

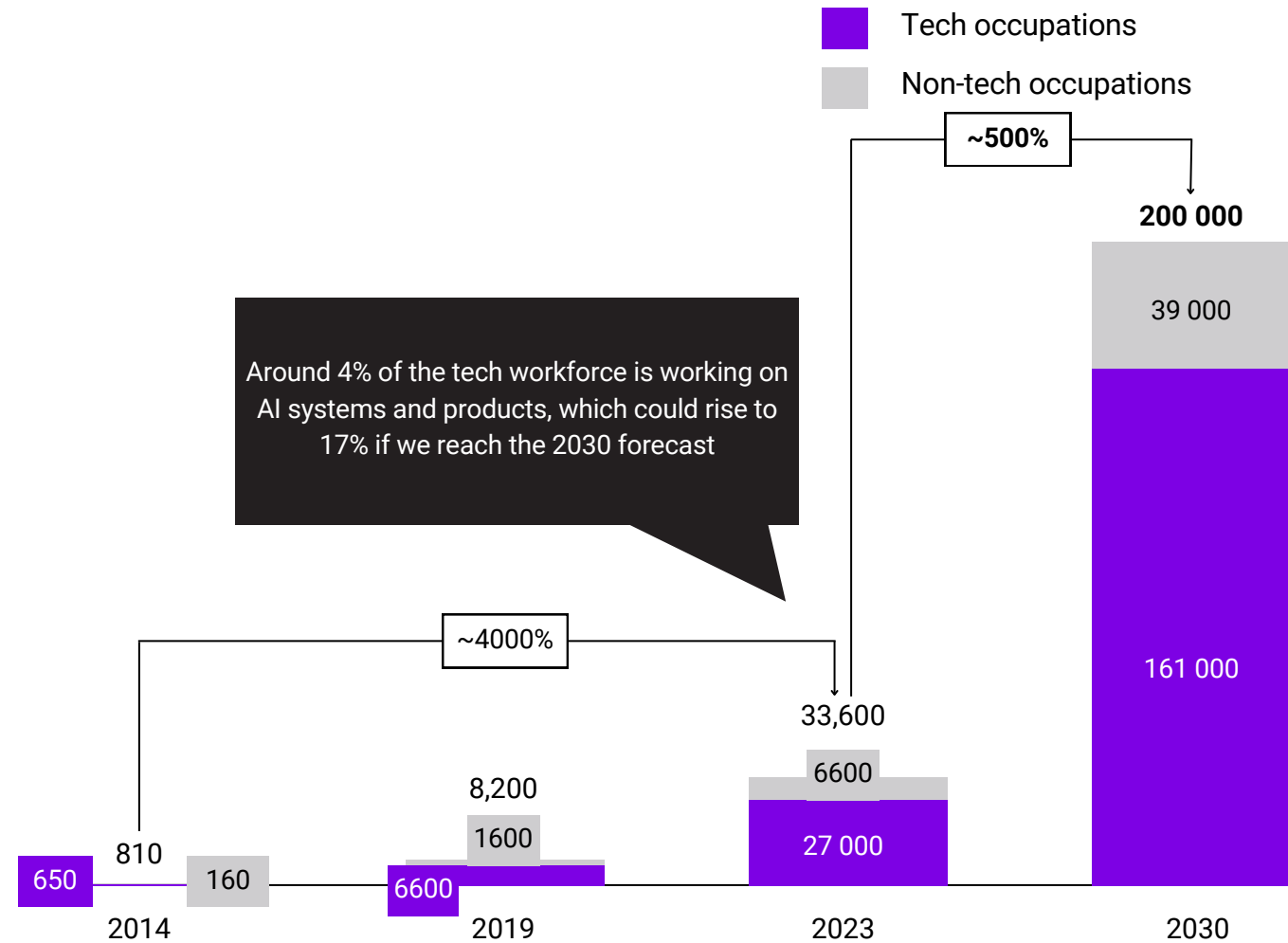
We've seen rapid growth in the AI workforce in recent years, with around 4,000% growth over the last decade. This extraordinarily high growth rate has been off a very low base of approximately 800 AI workers in 2014 to reach just over 33,000 in 2023. Currently, the largest employers of AI workers are Education and Training, Technology and Financial Services. Looking ahead, we'll need to sustain growth at approximately 500% between now and 2030 to reach this forecast.

### This forecast builds on the CSIRO Artificial Intelligence roadmap

In 2019, the CSIRO published the Artificial Intelligence Roadmap which forecast that Australia could have 161,000 specialist AI workers by 2030. Those forecasts captured the technology occupations closely associated with AI technology development. We have built on those forecasts to account for the people in non-tech occupations that are directly supporting the scaling, governing and management of these systems.

### AI workforce estimates

Number of AI workers in Australia



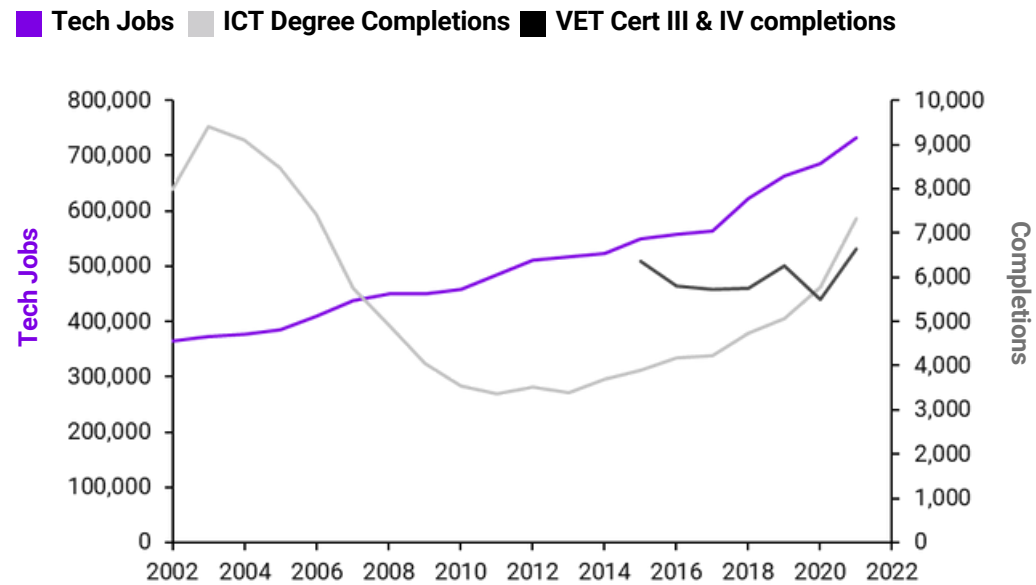
**Note:** The methodology we adopted to estimate current estimates of the AI workforce is included in Appendix I. Source: 1) CSIRO, Artificial Intelligence Roadmap (2019). 2) ABS, Labour Force Survey (2023), LinkedIn

## Past experience shows that growth in AI jobs may not result in greater uptake of AI skills training, creating a risk of skills shortages

Despite strong growth in the AI workforce over the last decade, we may not successfully fulfil the AI jobs potential over the next few years if supply of the right skills cannot keep up with demand. We observed a similar pattern play out over the last 20 years in the race to keep up with demand for tech workers in Australia. Despite high, sustained growth in tech jobs, Australians didn't consistently undertake tech training at the same rate, through the university or VET system. This led to a generation of missing tech workers and severe skills shortages in the last few years.

### Tech jobs growth and ICT degree completions

Number of people, 2002 - 2022



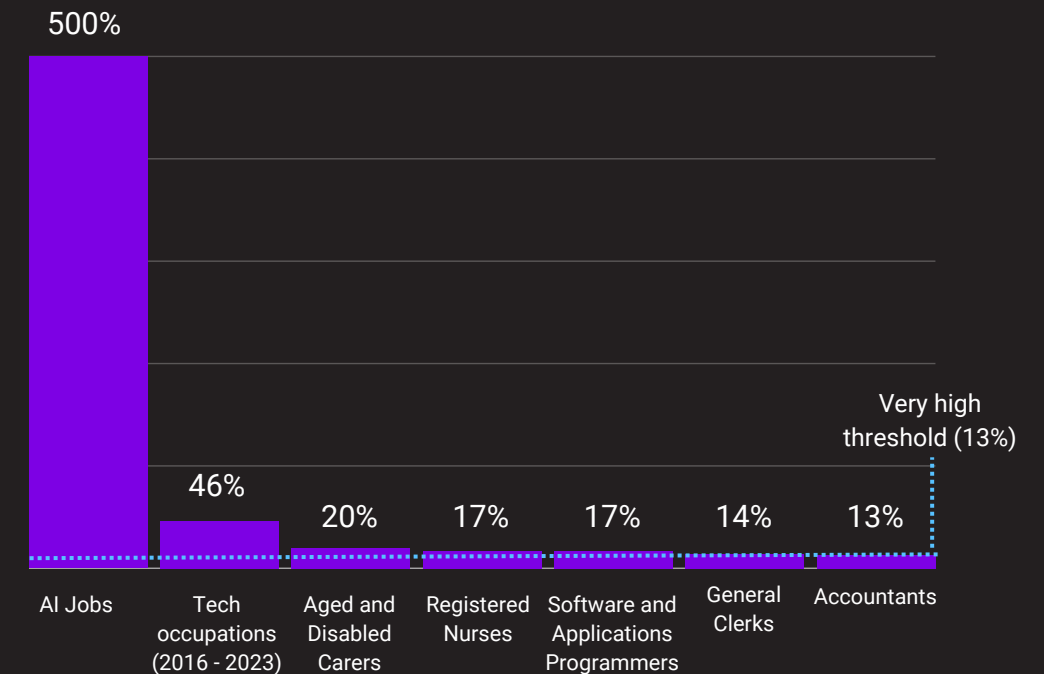
Source: TCA, Tech Jobs Update Report (2023), DEWR, Award Course Completion by Field of Study and Field of Education

## To fulfil the AI jobs opportunity we need to see our AI skills supply grow as quickly as demand

To reach 200,000 AI workers by 2030, we need the workforce to grow by approximately 500%. To put that growth rate into context, we have put it alongside the growth rate for tech occupations over the previous seven years, and the five fastest growing occupations between now and 2030 according to Jobs and Skills Australia. This shows that AI jobs are expected to grow at an extremely fast rate.

### Fastest growing occupations, forecast

Growth in employment, 2023 – 2030 (unless otherwise specified)



Note: See Appendix I for more information on our methodology. Source: Jobs and Skills Australia; ABS; CSIRO; TCA analysis

## In this report we examine the state of skills supply across four areas that are required to build and scale AI systems

A range of skills are required to successfully build and scale AI systems. We examine the state of skills supply across four areas: developing, scaling, governing and managing. These skill areas have been developed based on the Tech Council's Startup Skills taxonomy and consultation with experts.

To fulfil the AI jobs opportunity, we know that we'll need the workforce to meet two challenges:

- 1. Job requirement changes – including skill and knowledge changes.**  
To understand the nature of job requirement changes we have examined job advertisements and conducted interviews with a range of tech employers and experts.
- 2. Increased supply of people in AI jobs – including tech and non tech occupations.** To understand the current trends in supply growth we've examined the trends in experienced and entry level talent employment. We've also considered the degree of responsiveness in supply by considering vacancy rates, the efficiencies from AI adoption and the nature of education/training pathways.

Through examining both factors, we can provide a high-level assessment of where we might see challenges in growing the AI workforce.



### Developing

This group includes occupations that are responsible for developing, designing and maintaining AI systems. Occupations within this group range from Machine Learning Engineers, to Cybersecurity professionals, and UX Designers.



### Scaling

These occupations support organisations to commercialise and scale AI systems. Occupation within this group range from Sales Managers, to Accountants and Human Resource Managers.



### Governing

These occupations are responsible for developing and maintaining the ethical, legal and other controls to ensure compliance of AI systems. Occupations in this group include lawyers, AI Safety Officers and Policy Managers.



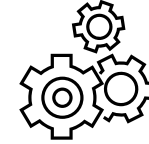
### Managing

These occupations set organisation-level strategies and ensure alignment across the other three skills groups (developing, governing and scaling). Occupations within this group include C-Suite roles such as CEOs and Chief AI Officers.



# The AI Jobs Opportunity

## Developing Occupations



## Scaling Occupations



## Governing Occupations



## Managing Occupations



## Summary & Recommendations

## Appendices

# DEVELOPING

## AI development jobs encompass six functions that will likely draw on tech and similar STEM roles as feeder occupations

### Engineering

Engineering jobs involve developing, testing and deploying artificial intelligence models and integrating them into software. Some of these jobs will involve deep technical skills in machine learning, others in this areas will likely focus on integrating AI tools/models, similar to existing engineering jobs.

### Cybersecurity

In AI cybersecurity, professionals focus on protecting AI-powered systems and data from unauthorised access and attacks.

### Data

Data roles in AI involve managing, analysing, and interpreting large sets of data to train and improve AI models. These professionals ensure data quality, prepare datasets for training, and analyse outputs to refine AI algorithms and systems.

### Product

AI product managers oversee the development of AI-based products, from conception to launch. They work at the intersection of business, technology, and user experience, ensuring that the product meets market needs and is technically feasible and user-friendly.

### Design

AI designers focus on creating user interfaces and experiences for AI-driven applications. They ensure that interactions with AI systems are intuitive and effective, addressing user needs and behaviours while embedding AI seamlessly into the design.

### IT Operations & Architecture

Professionals in this area focus on the infrastructure that supports AI systems. They design and manage the architecture to ensure that AI applications are scalable, reliable, and efficient, often integrating cloud technologies and ensuring system interoperability.



**These jobs are most likely to be filled by people with similar skills and experience**

To understand whether we're on a path to meeting rapid increases in demand we've examined whether established supply pathways are sufficient to meet demand. Established supply pathways include people in 'feeder occupations'. These are the occupations that have good skill matches to AI jobs. More information on how we identified these feeder occupations is included in Appendix II. The full list of feeder occupations is included in Appendix III.

# DEVELOPING

**Summary: AI development jobs present a significant jobs opportunity which we're unlikely to fulfil without a greater diversity in training options and targeted skilled migration**

**AI development jobs are similar to many existing tech jobs, but are expected to see some changes to job requirements**

Most AI jobs are seen as 'evolutions' of pre-existing tech jobs. For instance, Machine Learning Engineers share many of the foundational skills as Software Engineers plus additional expertise in Machine Learning and data analysis.

Many of these AI jobs have almost identical skills to pre-existing tech jobs but will require demonstrated experience applying those skills in an AI context.

Given the degree of skills and experience change, we're expecting AI jobs to often be filled by people in pre-existing tech jobs and 'nearby' STEM occupations that have similar skills. We think of these as the 'feeder occupations' to AI jobs.

**The 'feeder' occupations to AI jobs are growing fast, but this is unlikely to be fast enough to meet rapidly rising demand**

Our preliminary assessment of supply paths suggests that this part of the workforce is growing well, with medium or high growth rates in supply paths. But this level of growth is unlikely to match the extremely high growth expected in demand. The primary factor limiting supply growth are vacancy rates, meaning these occupations are already in shortage and constrained in their ability to meet additional demand.

**Growth in alternative pathways, namely mid-career retraining, could support the workforce to meet rapidly rising demand**

Mid-career transitions are not common across these roles, with the exception of Product roles. Raising the rates of mid-career transition into tech – which commonly requires retraining – could support the workforce to meet rapidly rising demand for these skills. We expect skilled migration to also play a role, particularly for highly technical, experienced roles. Our analysis suggests that skilled migration currently plays a significant role in Engineering roles, but probably has greater scope to support workforce growth across other functions.

# DEVELOPING

## The shift to working in an AI development job will require some change in skills and experience, even for people currently working in very similar tech jobs

### Core tech skills will still be in demand

Most AI development occupations retain the same core skill requirements. For instance, across both the non-AI and AI domains, Data Scientists generally need strong proficiency in SQL and other programming languages, data visualisation and communication skills and the ability to work with adjacent functions (e.g. sales, engineering teams) to solve problems.

### But employers are expecting experience applying these skills in AI applications

For occupations where we're not observing significant skills change, we are consistently seeing demand for these skills to be applied to AI products or systems – which requires new knowledge and practical experience.

### Engineering roles are the exception with the greatest breadth and degree of change

Skills requirements in engineering roles are changing. There is growing demand for engineering workers with Machine Learning and data analysis skills.

Source: TCA, Tech Jobs Update Report (2023), DEWR, Award Course Completion by Field of Study and Field of Education

However, the degree of skills varies based on the type of AI development and/or adoption. While some organisations will need technical specialists to develop bespoke models, many organisations are adopting AI primarily via integrating existing AI tools on cloud platforms into their software. The latter type of AI adoption only results in a marginal skills change for engineering workers. For organisations developing their own AI tools and models, we require a moderate/significant skills change from pre-existing software engineering roles.

### How do we assess job requirement changes?

To understand the degree of change expected in job requirements we've examined job advertisements and the evolution in skills taxonomies, including SFIA and O\*NET. This is complemented by interviews with employers.

Function	New skills/exp required in AI jobs	Degree of change required
Engineering	Machine Learning skills, understanding of LLMs specifically Data analysis / related skill	Marginal -> Significant
Cybersecurity	Experience securing AI systems / AI literacy	Marginal
Data	Experience using AI/ML methods	Marginal
Design	AI literacy	Minimal
IT Operations & Architecture	Understanding of AI provisioning and patterns	Minimal
Product	AI literacy and experience	Minimal

**KEY**

- Minimal
- Marginal
- Moderate
- Significant

# DEVELOPING

## Maintaining growth in entry level talent and providing training opportunities to these workers is key to meeting the demand for technical talent

**Entry level pathways into tech jobs have mostly been growing well which will help fill mid-career roles in the next few years**

Strong growth in entry level talent is an essential component of building our future workforce. Across the AI development functions there has been very high growth in employment of entry level talent. The only function that has seen less than high growth is Design with a slight contraction of young people over this period. Strong growth in entry level talent across these functions is a signal that we are able to attract young people into these roles and at relatively high rates.

This cohort of workers will be essential to meeting demand for technical talent in roles requiring experience between now and 2030. Ensuring we have healthy retention rates and ongoing training opportunities will be key to ensuring these workers can make the transition into AI-intensive roles.

**Employers report that tech workers in these areas are rapidly upskilling which is essential to meeting rising demand for skills.**

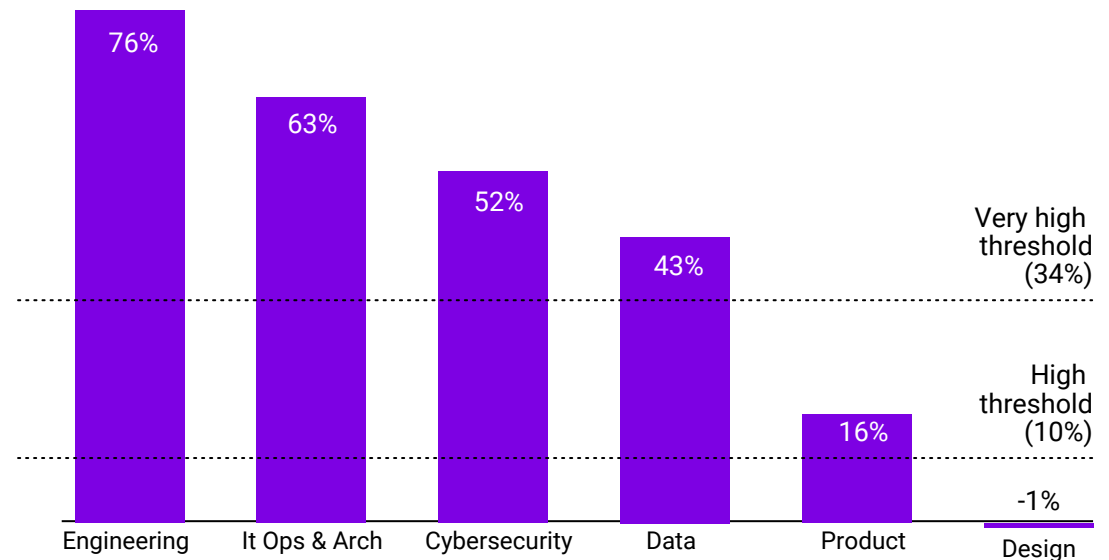
Employers of tech workers (across tech companies and the broader economy) are consistently reporting that they're seeing people working in AI development occupations/similar technology roles taking the initiative to upskill themselves.

Source: ABS

Many employers are also offering training programs and support that can assist their employees with upskilling and are finding that many people in these roles are seeking to actively upskill themselves. For many workers already in tech roles, some of this change is occurring naturally as their organisations shift to having a greater focus on AI, particularly if the main change in role requirements is in experience rather than skills.

### Growth in employment of young people

Growth in number of people aged 20-24 years old, employed, 2016 - 2021





# DEVELOPING



**Mirta Fagundes Dos Santos**

Team Leader, Artificial Intelligence  
Wisetech Global



## Case study: upskilling as a path into the tech workforce

Mirta had built her career in process improvement, starting in the manufacturing sector and then moving into the service industry. But when ChatGPT was released, she became obsessed with Generative AI. “I found myself spending most of my days thinking about, and tinkering with generative AI in my personal and professional life. I knew this was the future, and I wanted to be involved.” When she saw an opportunity to join Wisetech in their AI team, Mirta made the move.

In her role as a Team Leader in Artificial Intelligence at Wisetech, Mirta leverages her experience in process improvement and combines it with AI tools to help automate existing processes. One of the most helpful aspects of her transition into tech has been how accessible AI tools are. “I have no programming background, and I didn’t need to go back to school or completely requalify - I could just dive right in and start developing real solutions using resources I found online.”

The biggest challenge moving into this AI role has been the ‘ridiculously fast’ pace of advances in AI. “It feels like every morning I wake up, there’s a new update waiting for me. And not just new, but significant in terms of the impact on my work and what I am trying to do.”

Mirta’s advice for anyone looking to move into an AI job without a tech background is to dive in headfirst. “The more you use the technology, the more intuitive it will feel, and the more fluent you will become. Don’t get hung up on the skills you are missing; there are plenty of no-code solutions out there to get you started.”

“In the AI field today, thinking and ideation is the number one skill needed, rather than tech skills. This is because the constraint we face isn’t figuring out how to do something, it’s figuring out what to do.”

# DEVELOPING

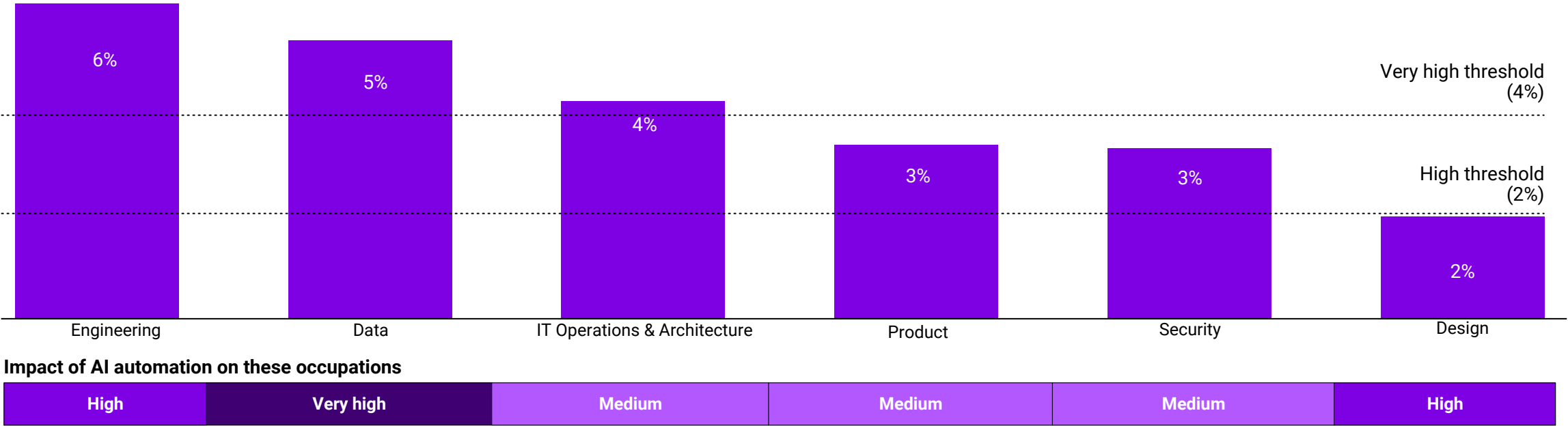
But the existing tech workforce is already facing shortages across several roles which may constrain the scope to meet rapidly rising demand

The occupations that are most likely to be pathways into AI jobs will also be subject to demand from other areas of the tech workforce and economy. To understand the current state of this demand, we've examined vacancy rates for these occupations.

Vacancy rates for November 2023 show that the occupations within these functions are likely already in shortage. This significantly constrains the ability of these occupations to fulfil rapid growth in additional demand from growth in the AI workforce. However, we also know that over the coming period we're likely to see adoption of existing AI technologies which will likely automate some tasks and increase the availability of skilled talent in these occupations to some degree. The ratings for the impact of AI automation are shown below the chart on the right hand side.

### Vacancy rates

November 2023



Source: ABS; Jobs and Skills Australia; Tech Council of Australia

# DEVELOPING

## AI development jobs are expected to see high or medium rates of workforce growth based on existing growth paths

Established domestic supply pathways are expected to grow well based on recent trends. Data, Design and Cybersecurity functions are all expected to see high levels of growth. Engineering, IT Operations & Architecture and Product functions are expected to only see medium growth.

	Expected supply growth path	Skilled labour availability	AI automation efficiencies	Entry level growth
		<i>Inverse of vacancy rate ranking</i>	<i>Degree of time impacted by automation or augmentation</i>	<i>The growth in employment of entry level talent</i>
Data	High	Low	High	Very high
Design	High	Medium	Very high	Medium
Engineering	Medium	Low	Medium	Very high
IT Ops & Arch	Medium	Low	Medium	Very high
Product	Medium	Medium	Medium	High
Cybersecurity	High	Medium	High	Very high

These expected growth rates are preliminary assessments that indicate the capacity of these occupations to grow relative to other parts of the Australian labour force. This assessment of expected supply growth is a summary of three indicators:

- Skilled labour availability – this is the inverse of the vacancy rate ranking and provides an assessment of the current spare capacity among workers with similar skills to these AI jobs
- AI automation efficiencies – this is the degree of time we expect to be impacted by automation or augmentation. A greater impact on time is expected to result in greater availability thus scope to meet rising demand.
- Entry level growth – this is the relative rate of growth in employment of entry-level talent (aged 20 – 24 years old). Strong growth in this part of the pipeline is essential to meeting future demand.

While these indicators show these areas of the workforce are growing well, it also suggests these will fall short of the extremely high demand growth rates expected.

# DEVELOPING

## High skills growth across most AI development jobs will not be enough to meet the extremely high growth in demand over this period resulting in shortages

Within the AI development area there are six functions and all are expected to be in shortage by 2030 if demand is extremely high. The most severe shortages are expected to be in Engineering roles. This is the product of a relatively high degree of shortage and a moderate amount of job requirement change. The degree of job requirement change suggests how difficult it will be to meet any shortages. This is because greater job requirement changes are expected to take longer to address with more retraining/experience required.

### Size of shortage

Expected difference between domestic demand and domestic supply growth from established pathways

Very High				
High	Product IT Ops & Architecture		Engineering	
Medium	Design	Cybersecurity Data		
Low				
	Minimal	Marginal	Moderate	Significant

### Stickiness of shortage Job requirement change

### Shortage assessment method

There are two factors that inform our shortage assessments: the size of the shortage and the stickiness of the shortage.

- **Size of shortages:** To estimate the potential size of shortages, we compare the expected skills supply and demand growth ratings. These ratings are converted into quantitative scores (Low = 1, Extremely high = 5). We subtract the supply score from the demand score to identify the shortage size rating. This provides a high-level assessment of the potential relative shortage size, and a clear ranking of functions that are likely to have greater difficulty meeting skills demand.
- **Stickiness of shortages:** This is proxied by the degree of job requirement change provided earlier in this report. Jobs with a bigger change in skills and/or experienced requirements will be harder to fill with the existing workforce. For jobs in shortage, this makes the shortage harder to address because it takes more time for workers to upskill/reskill or gain new experience.

These scores are approximations and the exact degree of shortage (i.e. the specific number of unfilled positions) is likely to vary within a single rating. These results provide us with a preliminary view of the challenges we should expect in meeting rapid growth in demand for AI workers across these functions.

# DEVELOPING

## A higher rate of mid-career transitions, supported by retraining, could help us meet workforce gaps

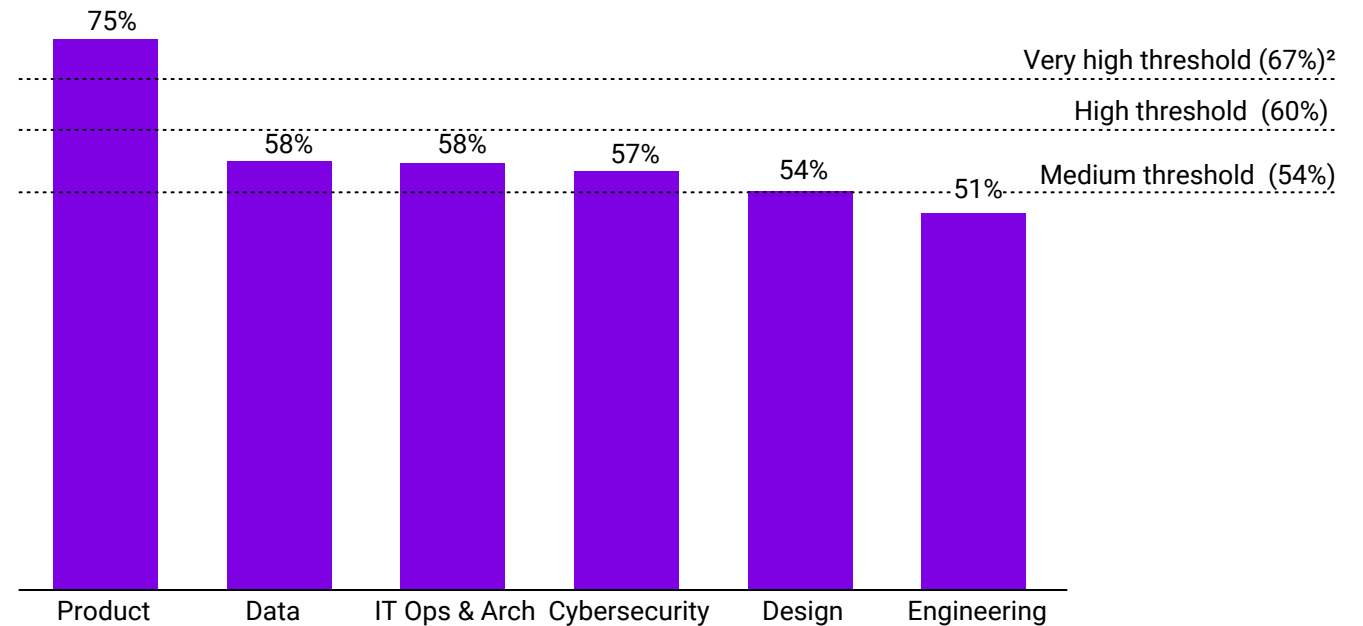
To meet demand for AI workers we’re expecting a range of pathways to play a role and this includes mid-career transitions. Career transitions can include small side steps, for instance from similar STEM jobs into tech jobs. However, they can also include larger shifts and more substantial retraining. To understand the potential for career transitions into AI development jobs we’ve examined Census data that captures people’s occupations in 2016 and 2021. In this graph we show the share of people who are in these occupations in 2021 but were not in 2016. To provide context for these rates, we provide economy-wide ranges.

Based on this analysis, we expect mid-career transitions to play a bigger role for non-technical areas like Product roles unless there is significant change in programs available. There could be a greater role for career transition into Data and Cybersecurity roles within the AI workforce, with these occupations seeing medium to high rates of transitions. While rates of retraining have been low into more technical areas, such as Engineering, we believe there is scope for people to sidestep into the less deeply technical areas. For instance, retraining into roles that require integration of existing AI tools into software rather than building cutting-edge AI models from scratch.

Expanding mid-career pathways into tech, particularly through earn-and-learn retraining programs, can also help improve diversity in the tech workforce. If organisations hired 20 per cent of early-career tech workers through alternative pathways, this could unlock an additional 31,000 workers from diverse backgrounds by 2030 according to Microsoft and Accenture.

### Career transition rates

Number of experienced workers<sup>1</sup> entering from other occupations, 2016 - 2021



Note: 1. Workers aged 25 – 64 in 2016. 2. These thresholds are the economy-wide average of career transitions between 2016 and 2021. This percentage is the number of people in the occupation in 2021 that were not in that occupation in 2016.  
 2. High and medium skills match groups refer to the occupations that have  
 Source: ABS; Microsoft and Accenture (2023) [Break down the barriers](#)

# DEVELOPING

## Greater uptake of short courses will enable the workforce to respond more quickly to gaps, but this will require a reversal of the growing trend towards more university-based training

A diversity of education and training pathways can help make the workforce more flexible to change which is essential to meeting rapidly growing skills demand.

For many of these feeder occupations into AI development jobs, university has historically been the primary education pathway. This graph shows that the predominance of university (as workers' highest qualification) has been consolidated in recent years.

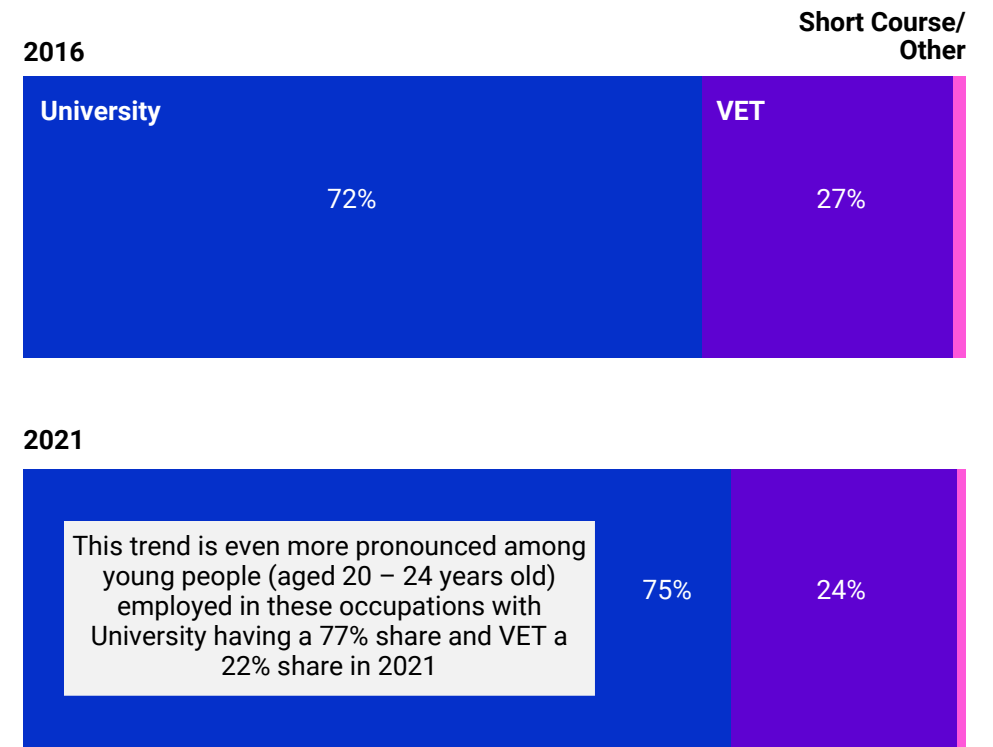
This graph shows the share of workers in AI development feeder occupations by their highest qualification. Each bar captures the workers employed in the given year.

While the share of short courses has remained small and stable, VET has decline by 3 percentage points which has shifted across to the University share. Some AI development jobs, particularly those with very technical skills, will always require university-level training. However, there are a range of roles for which shorter training times are suitable – particularly if people continue to undertake these shorter stints of training across their careers. Greater uptake in shorter training options – including VET and short courses – helps us meet rapidly rising demand for AI development jobs where that is a suitable type of training.

It's important to note that the role of short courses is likely undercounted in this graph due to data limitations. Workers with a university degree who also undertake VET or short course training will only be counted in the university degree category as this is their highest level of training.

### Growth in employment by qualification level

Growth in employment<sup>1</sup> by highest level of qualification, workers in high and medium skill match occupations, 2016 - 2021



Note: 1. This includes of people in high and medium skill match occupations for AI development occupations.  
 2. Short courses are proxied by the category 'Level of education not adequately described' in the Non-School Qualification: Level of Education variable in the Australian Census.

Source: ABS

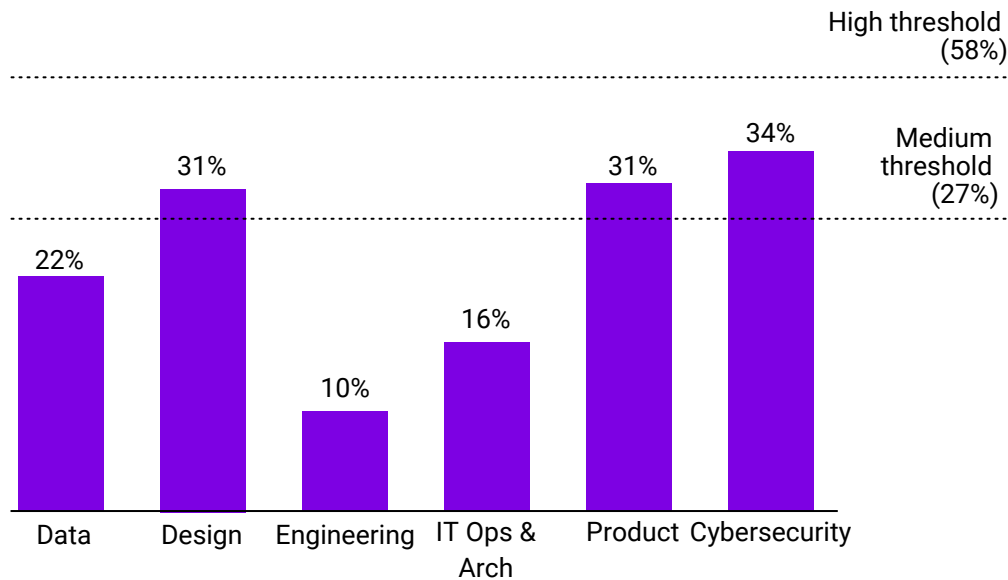
# DEVELOPING

## Greater uptake of short courses is more likely in Cybersecurity, Product and Design, which already have higher rates of VET training

Across feeder occupations for AI development jobs there is a consistent bias towards university-level training as the highest qualification held by workers. However, within some categories – Cybersecurity, Product and Design – there is good uptake of VET and/or short courses. This suggests that these functions will be best-prepared to adopt alternative training pathways.

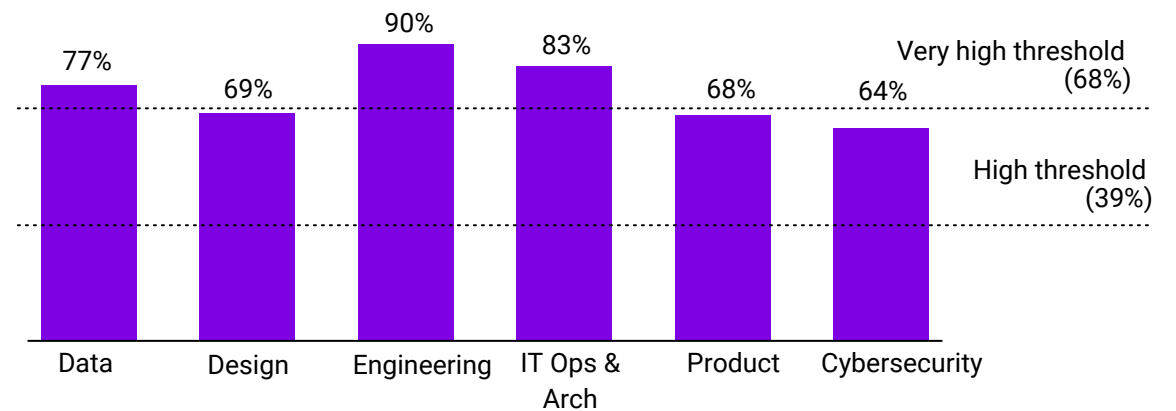
### VET qualifications

Employment of workers in AI development feeder occupations, 2021



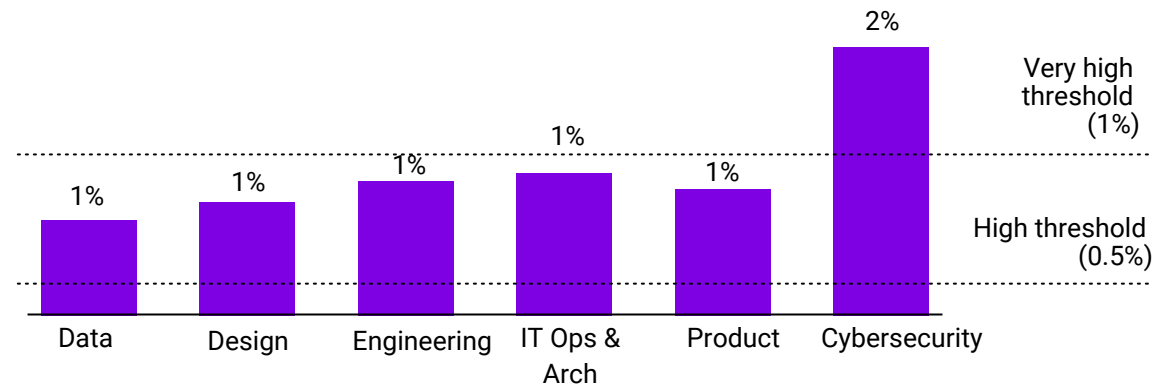
### University degrees

Employment of workers in AI development feeder occupations, 2021



### Short course / other

Employment of workers in AI development feeder occupations, 2021



Note: The thresholds provided on each chart displayed on this page represent the economy-wide quartiles of the distribution for each qualification type, with medium being the 25<sup>th</sup> quartile, high the 50<sup>th</sup> and very high the 75<sup>th</sup>.  
Source: ABS

# DEVELOPING

## Case study: retraining programs can support people from underrepresented backgrounds to move into tech careers



### Digital Cadetship Program Institute of Applied Technology - Digital, MEGT, Women in Tech, and Prodigy Learning

The Digital Cadetship Program has helped to address skills shortages in cyber, data and cloud skills while also providing an alternative pathway into tech for women from diverse backgrounds, including those returning to the workforce, newly arrived migrants, refugees, Indigenous communities, and career changers.

The program ran between June 2022 and December 2023, involving 63 cadets from professional backgrounds ranging from Beauty Advisor to Senior Finance Officer.

The program provided paid employment in one of the key discipline areas 4 days per week and a day of paid study 1 day per week for 14 weeks. The training in either Cyber Security, Data Analytics, or Cloud Computing was completed online via a combination of educator-led and self-directed learning using IATD Microskills and Microcredentials developed in collaboration with TAFENSW, Macquarie University, University of Technology Sydney, and Microsoft.

This program has seen great results, with 94% of the 63 enrolled cadets completing the program. Seventy per cent of cadets who completed the program reported ongoing employment with companies including Shell, EY, Boeing Defence Australia, ReadyTech and Virgin Australia.

The Digital Cadetship Program was a collaborative effort between MEGT, the Institute of Applied Technology - Digital (IATD), Women in Tech and Prodigy Learning. It was designed and funded as part of the Federal Governments Digital Cadetship Pilot.





# DEVELOPING



**Simon Ch'ng**

Machine Learning Engineer  
DXC Technology

*Graduate of the Victorian  
Government's Digital Jobs  
Program*

## Case study: retraining programs support tech workers to re-enter the tech workforce with new AI skills

When global technology services provider DXC Technology needed new AI talent, they turned to the Victorian Government's Digital Jobs program and found Simon Ch'ng.

Simon studied computer science at university and worked in tech before leaving the industry to help build his wife's optometry business. Seeking to return to the IT industry, Simon realised he needed to update his knowledge and thought the short courses available through the Digital Jobs Program were perfect.

Simon completed "Introduction to Machine Learning" at Monash College, with the flexible nature of the online course allowing him to fit study around other commitments. The 12-week course equipped him with cutting-edge AI skills and knowledge that built on his prior tech experience.

Simon secured a placement with DXC Technology, focusing on data visualisation and web browsing technology, followed by a permanent position, working as a Machine Learning Engineer. In this role, Simon works on a range of complex projects that use his new skills and draws on his life experience.

Simon believes his successful return to the tech workforce was made possible by the new skills he developed through the Digital Jobs program.

# DEVELOPING

## Skilled migration can also help to meet workforce gaps, particularly for highly technical roles requiring experience

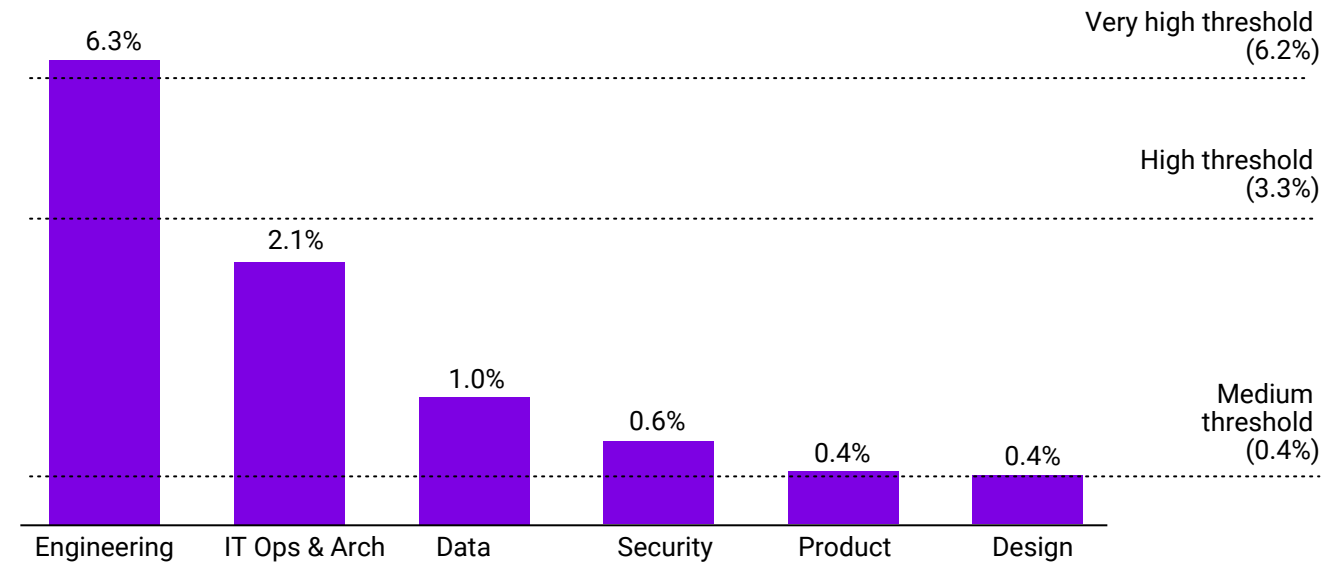
Skilled migration currently plays a small but crucial role in meeting the demand for tech skills. We expect this will continue with skilled migration enabling employers to recruit highly-skilled, experienced workers in niche technical areas to help grow our local workforce.

This graph includes the rates of skilled migration for occupations that have a high and medium skills match to AI occupations in each function listed (e.g. Engineering). This rate is measured by the number of visas granted in an occupation as a share of the total people employed in that occupation.

This data shows that skilled migration has mostly played a limited role compared to domestic skills supply in meeting demand for tech skills. The exception is in Engineering, which has seen a relatively high rate of skilled migration.

### Skilled migration rates, AI development functions

Share of employed people in occupation granted a visa in the same year, 2018 – 2023, average



Note: The thresholds here the average (Medium threshold), midpoint between the medium and very high threshold (High threshold) and the midpoint between the average and the maximum contribution (Very high)

Source: Home Affairs, Temporary Work (Skilled) Visa program



## The AI Jobs Opportunity



## Developing Occupations

## Scaling Occupations



## Governing Occupations



## Managing Occupations



## Summary & Recommendations

## Appendices

# SCALING

**AI scaling jobs encompass six functions that draw on a range of professional occupations that are employed across the economy**

**Sales**

Drives revenue by identifying and engaging potential buyers, effectively communicating the value of AI solutions to convert leads into customers, crucial for sustainable growth.

**Customer Experience**

Enhances product loyalty and user satisfaction by providing ongoing support and gathering feedback to improve AI solutions, critical for customer retention and product development.

**Human Resources**

Recruits and retains talent necessary for developing and advancing AI technologies, fostering a culture that supports innovation and growth.

**Marketing**

Raises awareness and generates demand for AI products through strategic messaging and campaigns, targeting the right audience to enhance market penetration.

**Finance**

Manages financial planning and risk by allocating resources efficiently, ensuring the company can invest in innovation and scale operations without compromising financial stability.

**Operations**

Ensures the smooth delivery of AI products by managing supply chains, optimising workflows, and maintaining quality control to support scalability.



**These jobs are most likely to be filled by people with similar skills and experience**

To understand whether we're on a path to meeting rapid increases in demand we've examined whether established supply pathways are sufficient to meet demand. Established supply pathways include people in 'feeder occupations'. These are the occupations that have good skill matches to AI jobs. More information on how we identified these feeder occupations is included in Appendix II. The full list of feeder occupations is included in Appendix III.

# SCALING

## **Summary: Tech is a relatively small employer of scaling occupations but supply may be inflexible to rapid increases in demand, driving up wages in some occupations**

### **The tech sector has been successful in attracting people in scaling occupations and we expect this to continue**

This suggests that tech is able to keep attracting people with these skills, and any past marginal changes in skills or experience required in tech relative to other industries are feasible to address at scale. For most of these occupations, the shift to AI will not require a significant skills change but employers are looking for people who have knowledge of the context in which they're operating. For instance, salespeople need to have an understanding of AI markets and trends.

### **While tech is a relatively small employer within scaling occupations, we're operating in a tight market for these skills**

Vacancy rates in these occupations suggest they may already be in shortage (except Marketing), which constrains our ability to meet additional demand. Growth in entry level talent has been strong in some scaling occupations (HR, Marketing, Finance) but limited in all others. The growth in entry level talent has been strong in Marketing, but moderate in all other functions. This suggests we shouldn't expect to see rapid, natural growth in experienced talent supply over the next few years. Automation and augmentation may alleviate some of these issues by enabling workers in these functions to be more efficient and remove the requirement for them to do repetitive, low-value tasks.

### **Rapid growth in demand for scaling skills in tech may create wage increases in these occupations**

We expect automation and augmentation may help alleviate shortages. However, to the extent that shortages remain and there is a tight market for scaling skills, rapidly growing demand (even from a relatively small employing industry like tech) is likely to push up wages. For the tech sector and other tech-intensive employers this is unlikely to inhibit their growth, but may impact other industries.

### **Supply shortages in scaling occupations will be harder to resolve in HR and Finance**

Many scaling functions have relatively high take-up of VET training suggesting that shorter and/or alternative training pathways will be more naturally adopted in these areas. This means those areas are less likely to struggle with skills shortages, because the labour force can respond more quickly.

Human Resources and Finance have relatively low take up of VET training and short courses. Without greater takeup of these or more flexible training pathways, any shortages will be harder to address.

# SCALING

The core skills across scaling occupations is remaining stable, but employers are keen to hire people with a stronger understanding of the context in which they're working: AI markets and trends

## The core skills in scaling occupations are still relevant to AI applications

There isn't a significant shift in the demand for scaling skills, with the core value-add of these functions remaining similar in an AI-intensive context. But employers believe it's important that people in scaling roles have a good understanding of the context in which they're operating and we are seeing this reflected in job advertisements.

The degree of change required in these occupations is expected to depend on how tool or product-specific the knowledge expectations are, as well as how focused the job is on particular tools or products.

Function	Knowledge/skills added for jobs in AI-intensive enterprises	Degree of change required
Sales	1. Experience in AI/ML products or markets	Marginal
Marketing	1. AI literacy 2. Understanding of the AI market / trends	Marginal / Moderate
Finance	1. AI literacy 2. Understanding of the AI market / trends	Marginal / Moderate
Human Resources	-	Minimal
Operations	-	Minimal
Customer Support / Experience	1. AI literacy	Marginal / Moderate

**KEY**  Minimal  Marginal  Moderate  Significant

Source: Australian and US AI role job ads from LinkedIn and Indeed and company websites of AI technology companies and startups

# SCALING

The direct tech industry is a relatively small employer of these occupations, suggesting there's significant scope to grow

The ability for the tech sector and tech-intensive firms to meet rapidly growing demand for scaling skills is also contingent on the scope for greater employment.

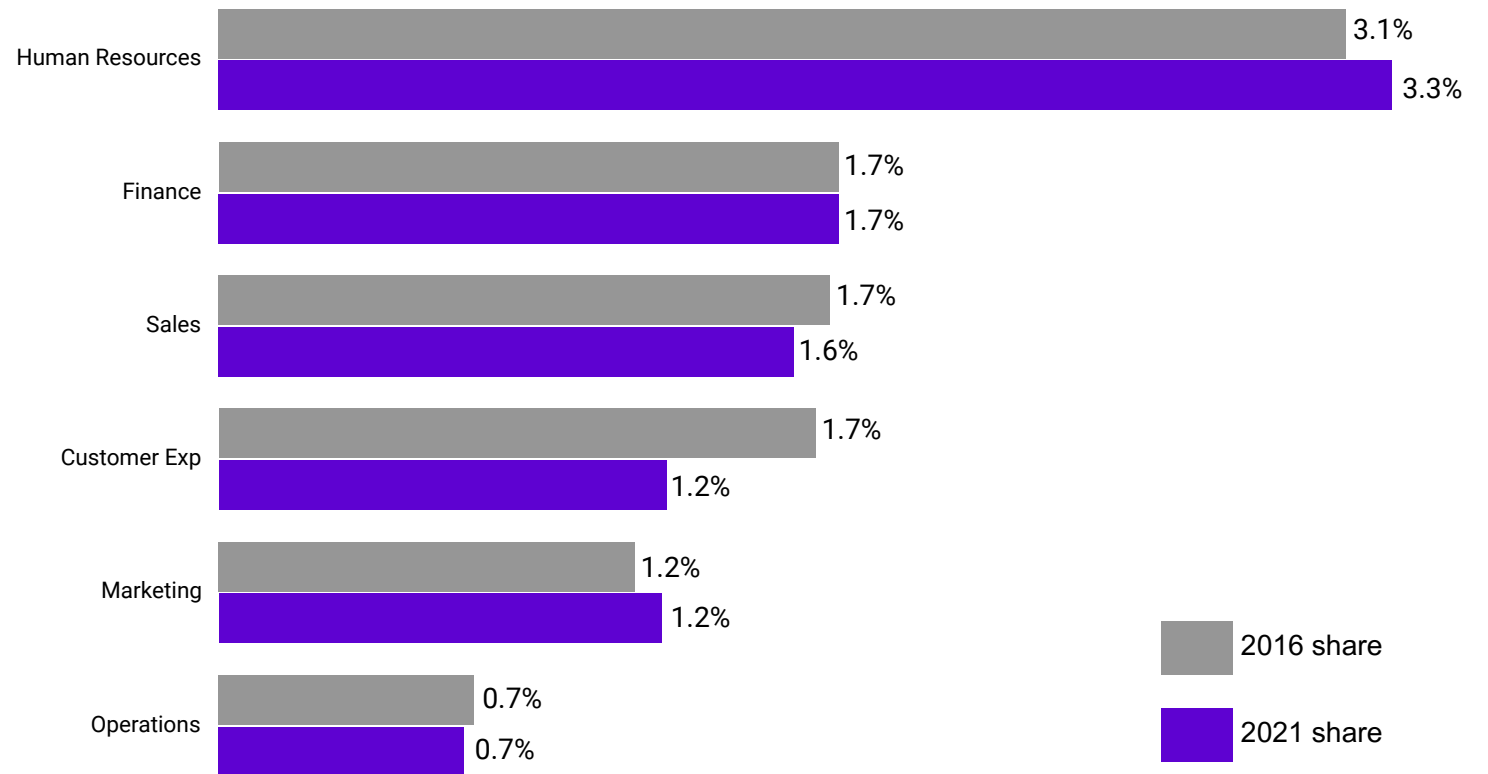
To understand the scope of the direct tech sector's employment of these occupations, we've examined the share of these occupations that direct tech employs.

Tech currently employs a relatively low share of people in scaling occupations relative to the overall share of workers in the economy (6.5%). The function in which direct tech plays the largest role is Human Resources with a 3.3%, roughly half that over our overall share of workers in the economy.

This suggests that direct tech has substantial scope to grow employment of people with scaling skills.

## Direct tech employment share for scaling functions

Share of total employment in occupations, 2016 and 2021



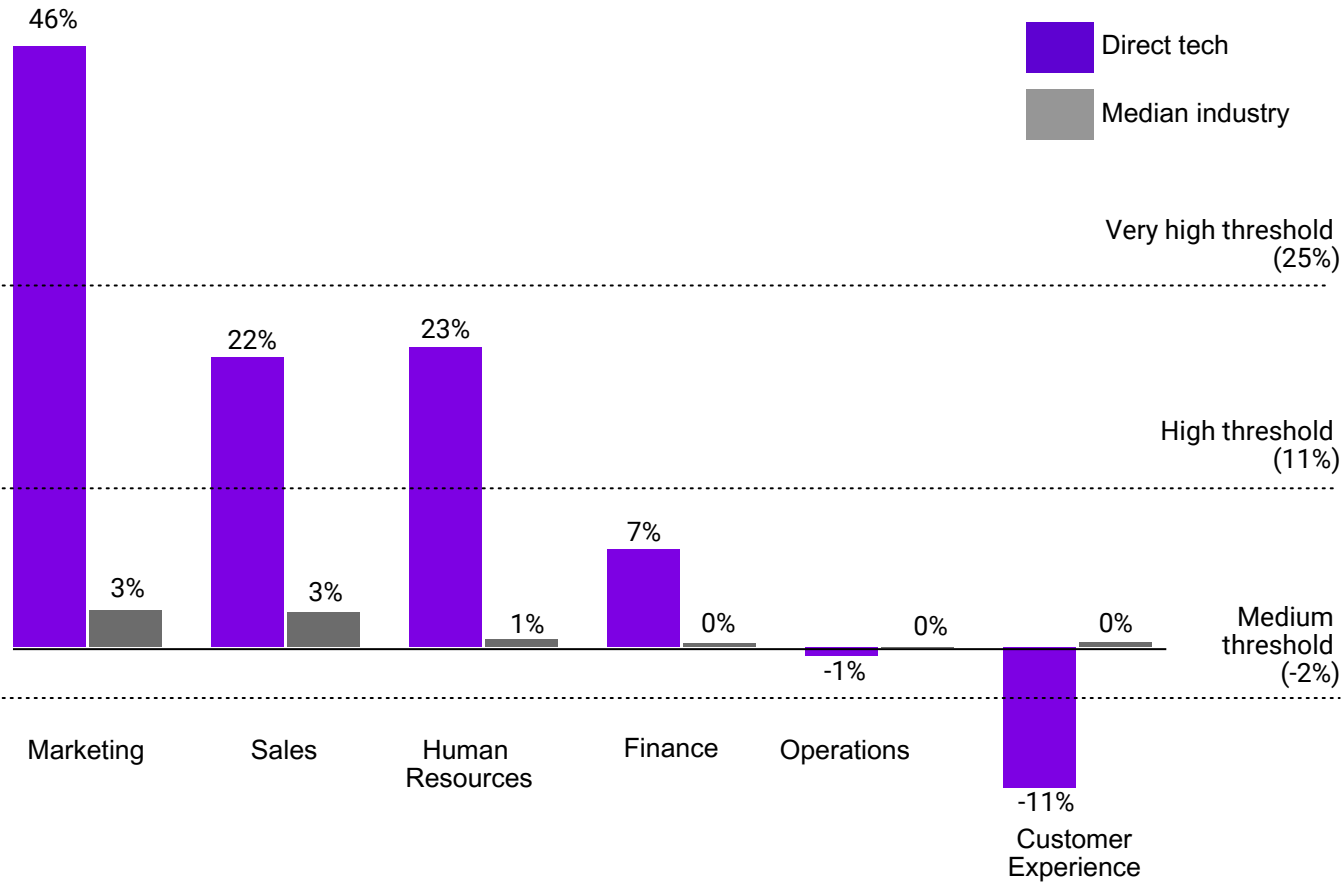
Source: ABS; Tech Council of Australia

# SCALING

## Tech-intensive firms are successfully attracting growing numbers of workers in scaling occupations

### Growth in direct tech employment of scaling occupations

Growth in employment of occupation in direct tech, median industry growth, 2016 - 2021



To meet strong growth in demand for people with scaling skills we need to attract people with these skills to work in contexts where they support the scaling of technology systems.

To understand whether we're able to attract people with these skills into tech-intensive areas, we have examined recent trends in employment growth for these occupations within the direct tech industry, which can be considered a proxy for other similar tech-intensive firms across the economy. For almost all scaling occupations, tech is a rapidly growing employer suggesting we'll be able to attract sufficient talent to meet demand in these occupations – as long as this talent is available in the labour market.

The exception is Customer Experience occupations which have seen a much larger drop in tech sector employment than in their median growth industry. However, given the strength of tech sector employment growth across other occupations, we believe this result is more likely a result of lower demand than an ability to attract people with scaling skills in these occupations.

Note: 1. These occupations account for 88% of scaling occupations and excludes ICT Sales Professionals which is the largest scaling occupation, but not included here because it is considered a tech occupation. The economy-wide thresholds exclude tech occupations, which are defined in the Tech Jobs Update 2024 (Appendix 1).



# SCALING

**There is mixed growth in entry level employment in these jobs but this is likely due to occupational transitions underway, rather than a lack of entry level talent pathways**

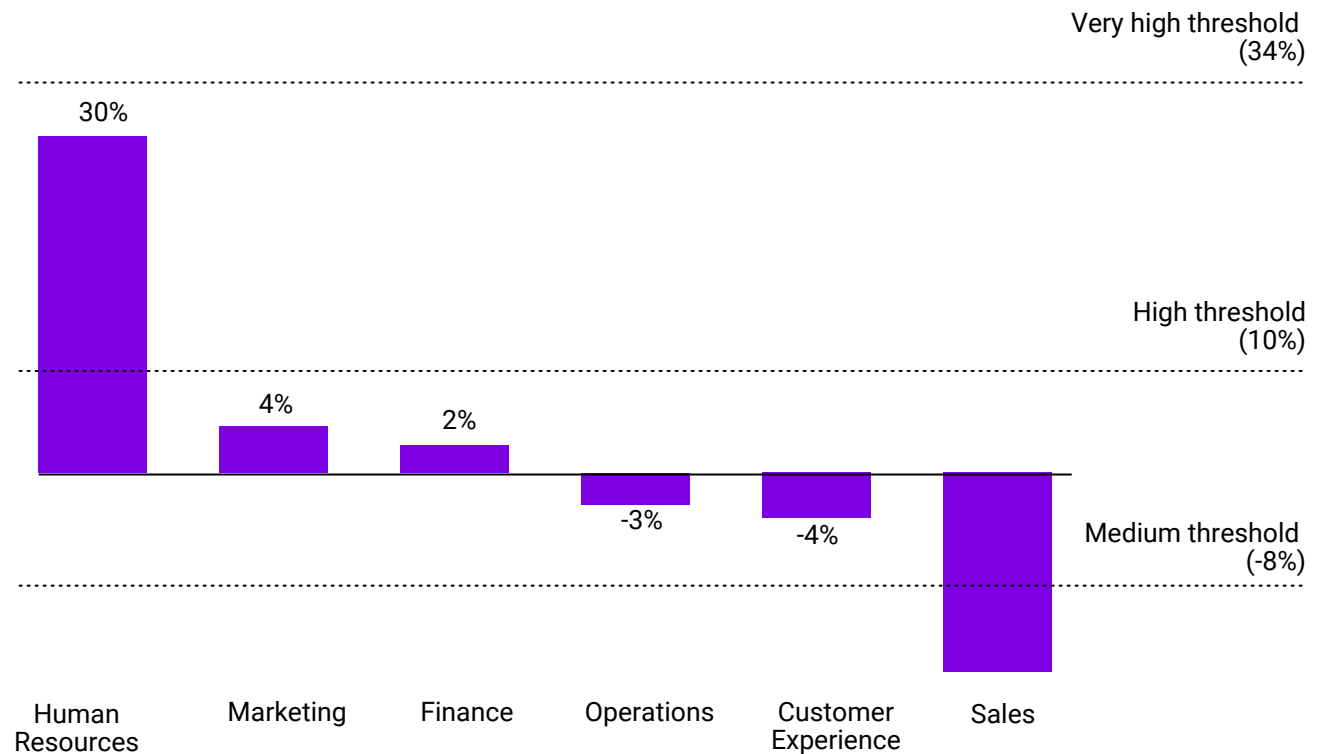
Strong growth in entry level talent is an essential component of building our future workforce. Across the AI scaling functions there has been varied entry level employment growth. This is proxied by the number of people aged 20-24 years old employed in these occupations across 2016 and 2021 across the economy.

Human Resources has seen high growth in employment of young people, followed by Marketing and Finance with positive and medium growth rates. There are two occupations with negative but (relatively) medium growth in employment of young people: Operations and Customer Experience.

While entry level employment has grown, on average, over this period by 10% there is a negative medium threshold which is the 25<sup>th</sup> percentile. This suggests there is some occupational transitions occurring within this set – with some occupations on the decline, even as the employment of entry level talent has grown strongly overall. This occupational resorting likely explains the drop in employment of young people in Sales, and small negative drops in Operations and Customer Experience.

## Growth in employment of young people

Growth in number of people aged 20-24 years old, employed, 2016 - 2021



Source: ABS

# SCALING

## Most scaling occupations are already facing shortages which limits their ability to meet rapidly rising demand

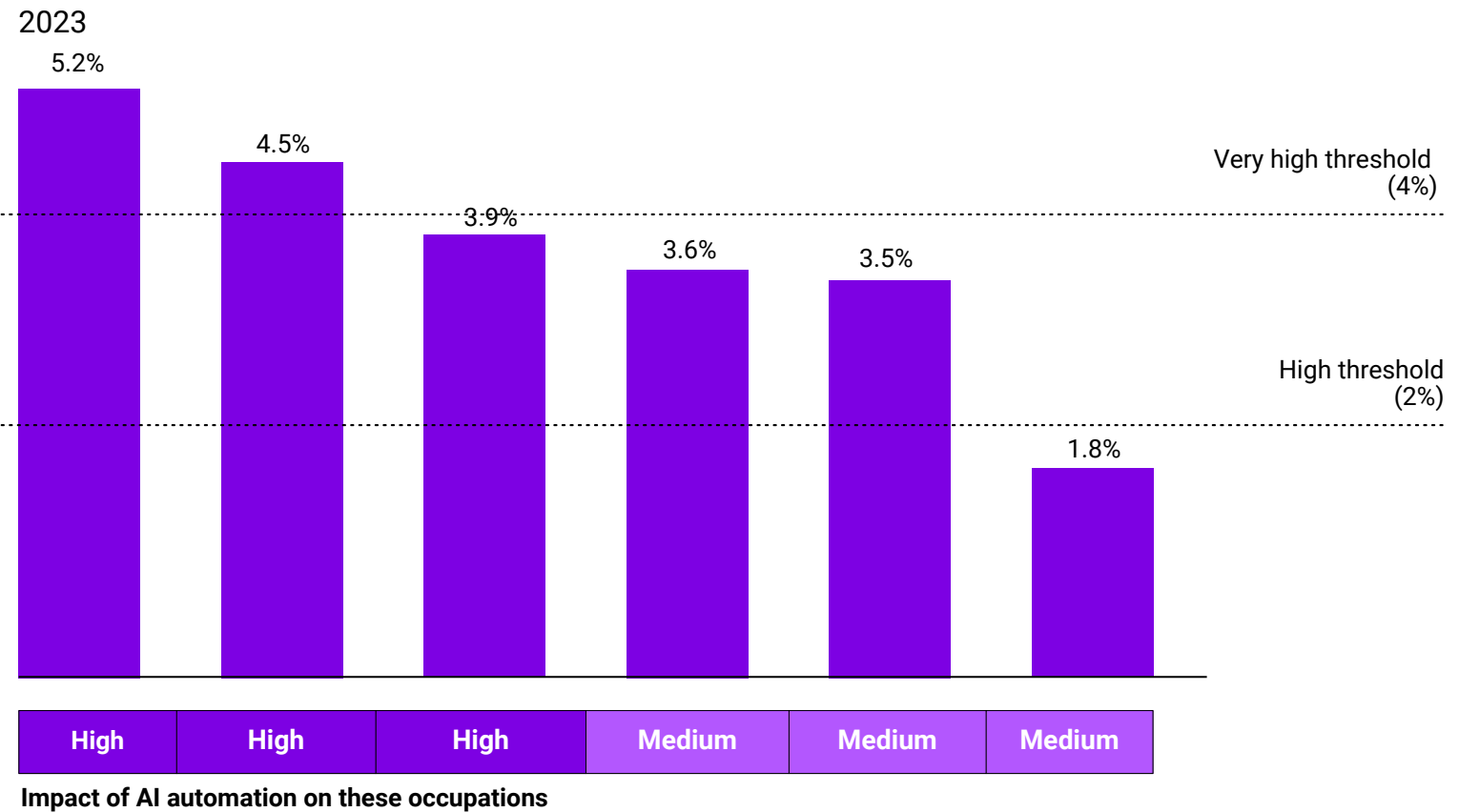
Vacancy rates provide an indication of the amount of unfilled jobs thus potential supply shortages. The vacancy rates across scaling function suggests that most are facing some degree of shortage.

Sales and Human Resources have very high vacancy rates. Customer Experience, Operations and Finance have high vacancy rates.

Encouragingly, the impact of AI automation and augmentation on these occupations is mostly correlated with the degree of shortage.

This means that some automation and augmentation may help alleviate existing shortages and provide greater opportunity for people to move into areas, like AI jobs, with rapidly growing demand.

### Vacancy rates



Source: ABS; Jobs and Skills Australia

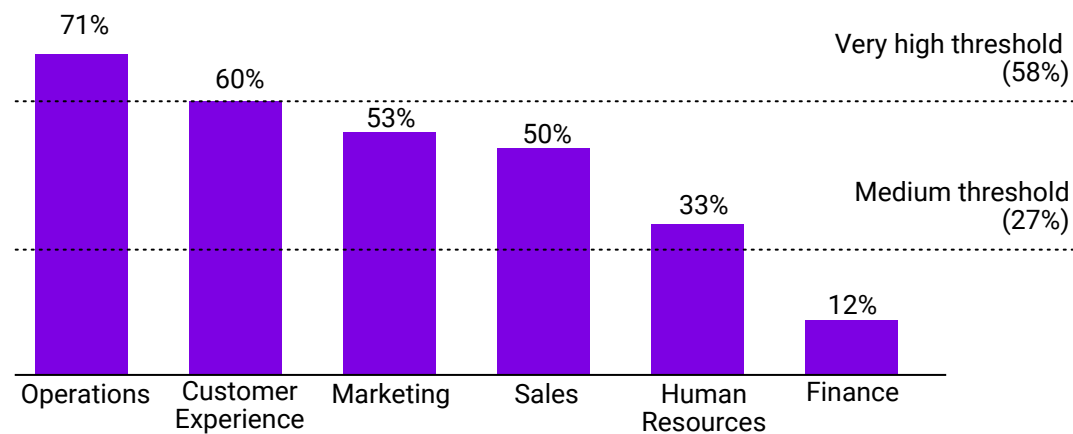
# SCALING

## Some scaling occupations are better prepared to meet rapidly changing demand, given their uptake of shorter training options

The roughly equal share of University and VET qualifications is driven by the range of functions within the AI scaling group, rather than a group-wide trend. Finance and Human Resources are biased towards University degrees as the highest qualification, while Operations, Customer Experience and Marketing have relatively high shares of VET as the highest qualification. These functions share a relatively low uptake of short courses / other as the highest qualification.

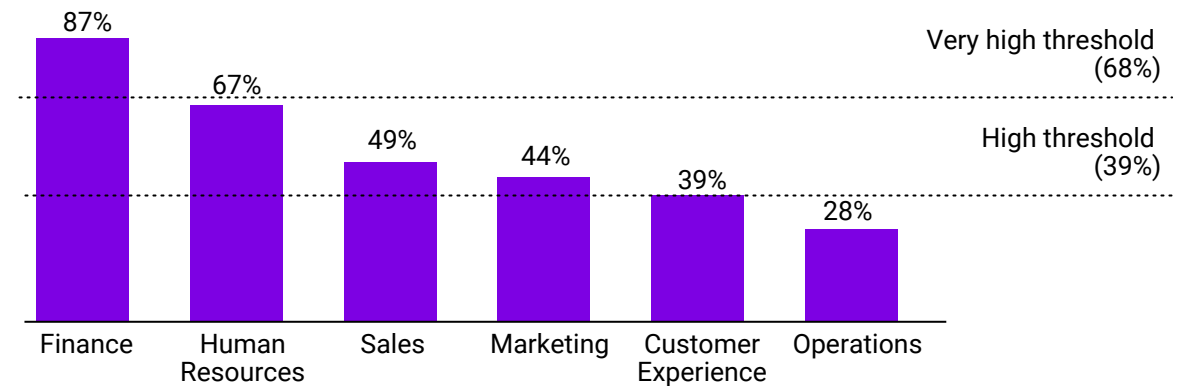
### VET qualifications

Employment of workers in AI development feeder occupations, 2021



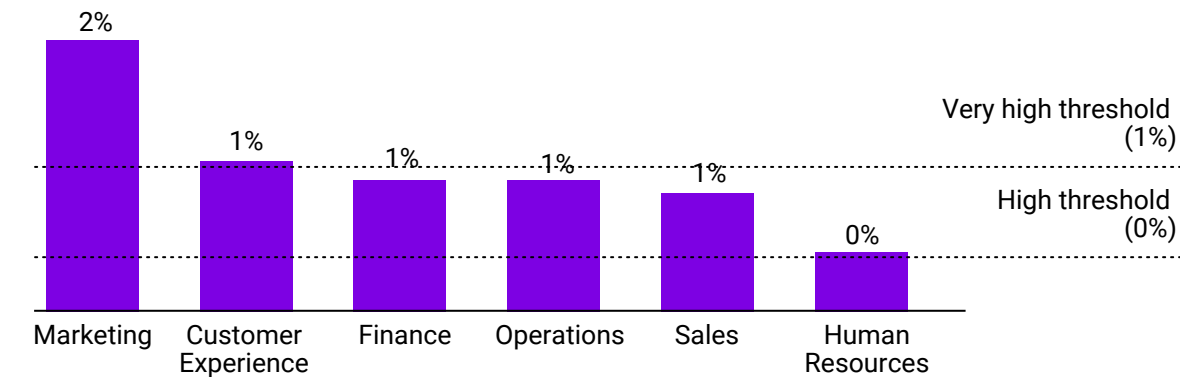
### University degrees

Employment of workers in AI development feeder occupations, 2021



### Short course / other

Employment of workers in AI development feeder occupations, 2021



Note: The thresholds provided on each chart displayed on this page represent the economy-wide quartiles of the distribution for each qualification type, with medium being the 25<sup>th</sup> quartile, high the 50<sup>th</sup> and very high the 75<sup>th</sup>. Source: ABS



**The AI Jobs Opportunity**



**Developing Occupations**



**Scaling Occupations**

**Governing Occupations**



**Managing Occupations**



**Summary & Recommendations**

**Appendices**

# GOVERNING

**AI governing jobs encompass three functions that draw on a range of professional occupations that are employed across the economy**

## Legal

Manages legal aspects including intellectual property, contracts, and compliance with laws, ensuring that AI development aligns with regulatory requirements and ethical standards, protecting the company from legal risks.

## Policy

Develops and advocates for policies that guide the responsible development and deployment of AI, interacting with regulatory bodies and stakeholders to shape regulatory approaches to AI technologies.

## Risk & Compliance

Identifies and mitigates risks associated with AI deployment, ensuring that all practices adhere to internal standards and external regulations. This function plays a crucial role in maintaining trust and safety in AI operations, preventing breaches and ensuring data integrity.



**These jobs are most likely to be filled by people with similar skills and experience**

To understand whether we're on a path to meeting rapid increases in demand we've examined whether established supply pathways are sufficient to meet demand. Established supply pathways include people in 'feeder occupations'. These are the occupations that have good skill matches to AI jobs. More information on how we identified these feeder occupations is included in Appendix II. The full list of feeder occupations is included in Appendix III.

# GOVERNING

**Summary: The main barrier to meeting demand for AI Governance roles will be the skill change, not overall potential supply**

## **Governance roles in AI are substantively different from their ‘mainstream’ counterparts**

The main driver of this change is the required knowledge in AI systems and policy issues. This will be particularly important over the next few years as industry and Government seek to navigate potential AI regulatory changes while supporting safe and responsible adoption.

## **There is scope for tech to become a much larger employer in these occupations**

Similar to scaling occupations, the tech industry has seen significant growth in people employed across governing occupations. This suggests that tech is able to attract people with these skillsets. Despite strong growth, we’re still a relatively small employer in these occupations suggesting there’s scope to meet much higher demand.

While these occupations have high vacancy rates, they’re also relatively exposed to AI automation and augmentation. At present, tech is competing in tight labour markets for people with these skills but greater adoption of AI by people in these jobs may make them more efficient and effectively increase labour supply.

## **While training pathways are relatively inflexible, the bigger challenge may come from upskilling and access to relevant experience for Legal and Policy roles**

A strong focus by both governments and industry on safe and responsible AI development and adoption is creating greater demand for policy and legal roles. These roles share many of the same skills as current roles in these fields – particularly in tech – but require new knowledge and a strong understanding of AI systems. It’s essential to provide opportunities for people to gain this knowledge through training and/or practical experience. This should be coupled with opportunities for people from technical backgrounds to upskill and/or gain experience in policy roles.

Skilled migration may also play an important role in filling rapidly growing areas that have much larger talent pools established overseas (e.g. data privacy experts in Europe as a result of the GDPR regulations). The migration reforms underway enable us to effectively meet demand for these skills by removing occupation lists for highly-paid specialist roles. This means tech employers will be able to recruit small numbers of highly specialised, experienced talent in these areas to fill immediate skill gaps and train local workforces in these areas.

# GOVERNING

**The core skills in these roles will remain the same, but demand for AI regulatory and policy expertise will require a significant uplift**

**Similar to scaling occupations, the core skills demanded across most of these occupations are fairly consistent**

Job advertisements for these areas remain focused on the skills that are core to these occupations, for instance, lawyers providing legal advice on regulatory issues. But applying those skills in AI requires a good understanding of the technology and the context in which it's applied.

**There is a shifting expectation regarding required knowledge**

Employers are looking for people who are literate in AI technologies, which is required to identify and understand how external changes may affect the company (e.g. regulatory changes) and how changes in the technology may interact with the regulatory environment. There is also a clear emphasis on having a strong understanding of AI trust and safety issues. Analysis of job advertisements also suggests that Risk & Compliance jobs, such as AI Safety Officers, are increasingly expected to perform data analysis as part of their regular tasks.

**Meeting the job requirement change in governing fields comes at a critical moment**

With greater commercialisation and adoption of AI technologies, industry and government need to work together to identify risk-based approaches to regulating and managing safe and responsible adoption. This will require having sufficient numbers of appropriately-skilled people in governance functions over the next few years which underscores the urgency of meeting this job requirement shift.

Function	New skills/exp required in AI jobs	Degree of change required
Legal	1. Strong AI and data literacy 2. AI regulatory issues	Moderate
Policy	1. Strong AI literacy 2. AI policy knowledge	Moderate
Risk & Compliance	1. AI literacy 2. AI trust and safety 3. Data analysis	Moderate -> Significant

KEY	Minimal	Marginal	Moderate	Significant
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# GOVERNING

## Growth in tech’s employment of governing occupations has been strong in legal and policy, but lower in risk & compliance

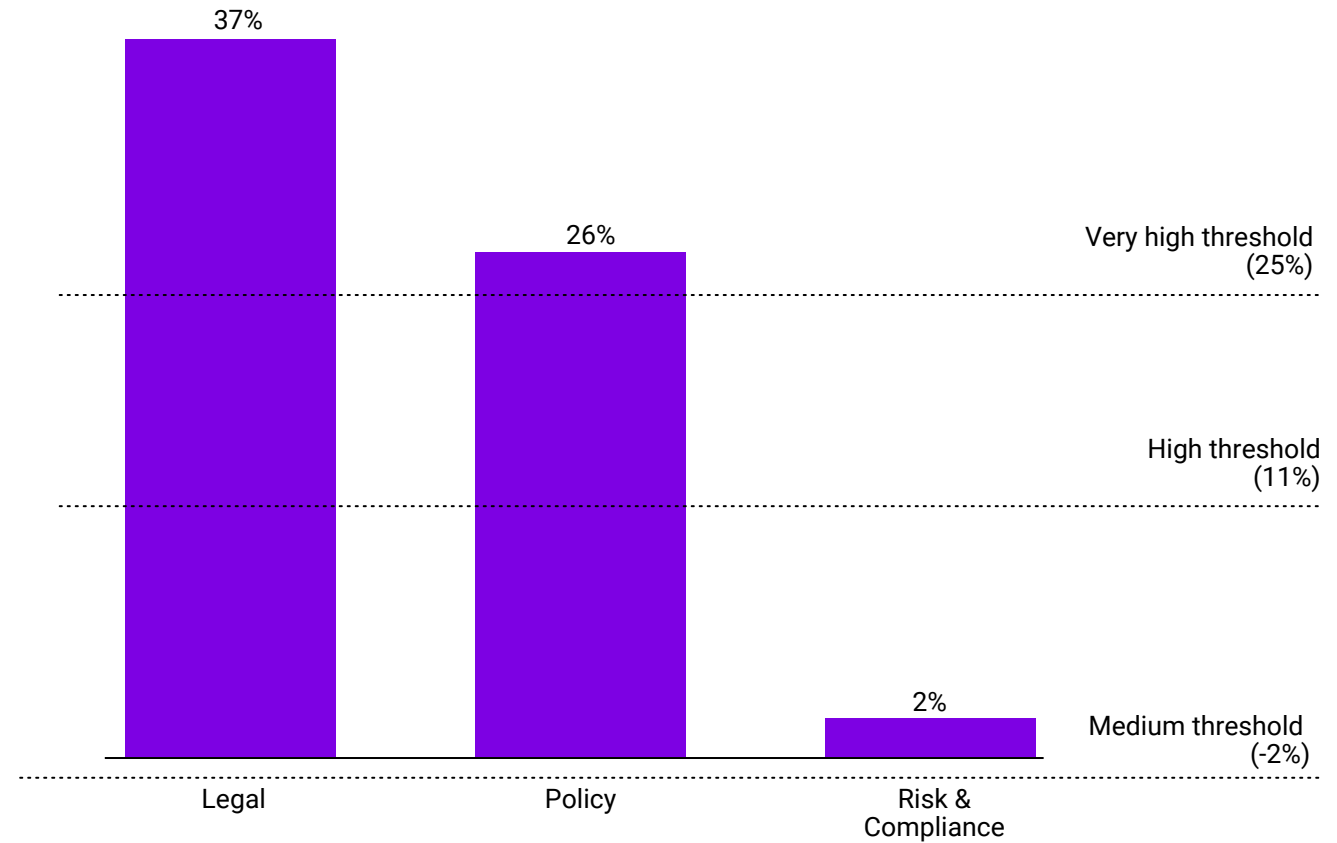
All governing occupations have seen above-average growth in employment, suggesting that the direct tech industry (and likely other tech-intensive organisations) are able to attract people with these skills.

Within the Governing functions, Legal roles have seen the highest growth rates (37%) , followed by Policy roles (26%). While Risk & Compliance employment in tech has only grown by 2%, this is still a strong outcome and above the medium threshold.

We note that there are limited occupations that are classed as ‘feeder occupations’ to Risk & Compliance due to the distinctiveness of AI jobs in this area. This may also mean that we will a very wide range of people from different backgrounds entering these roles if there are fewer ‘obvious’ nearby occupations which could make it easier to fill these roles.

## Growth in direct tech employment

Growth in employment of occupation in direct tech, 2016 - 2021



Note: 1. The medium threshold is negative because there are some occupations that have seen negative growth over this period.  
Source: ABS



# GOVERNING

## The direct tech industry also has significant scope to increase employment of people in governing occupations

The ability for the tech sector and tech-intensive firms to meet rapidly growing demand for governing skills is also contingent on the scope for greater employment.

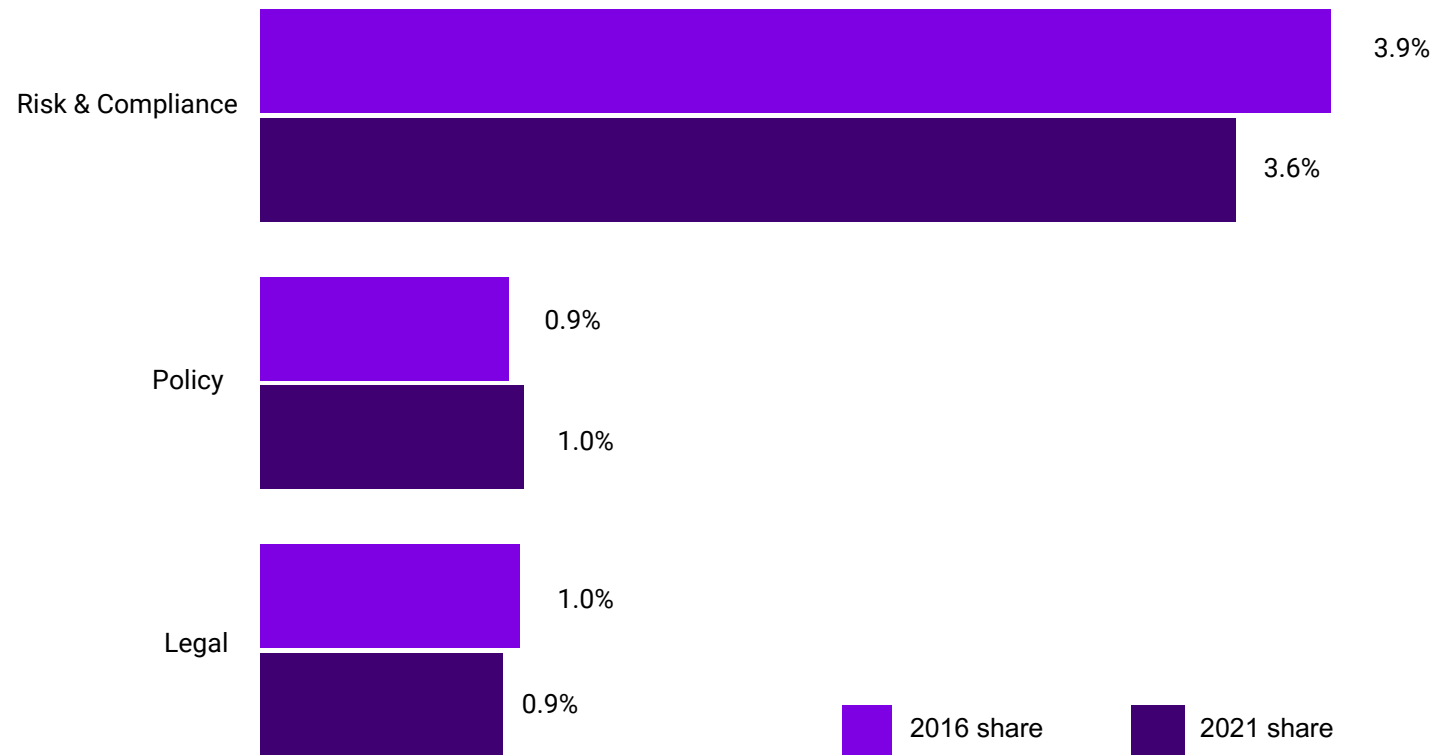
To understand the scope of the direct tech sector's employment of these occupations, we've examined the share of these occupations that direct tech employs.

Tech currently employs a relatively low share of people in governing occupations relative to the overall share of workers in the economy (6.5%). The function in which direct tech plays the largest role is Risk & Compliance with a 3.6%, slightly more than half that over our overall share of workers in the economy.

This suggests that direct tech has substantial scope to grow employment of people with governing skills.

### Direct tech employment share

Share of total employment in occupations, 2016 and 2021



Source: ABS; Tech Council of Australia

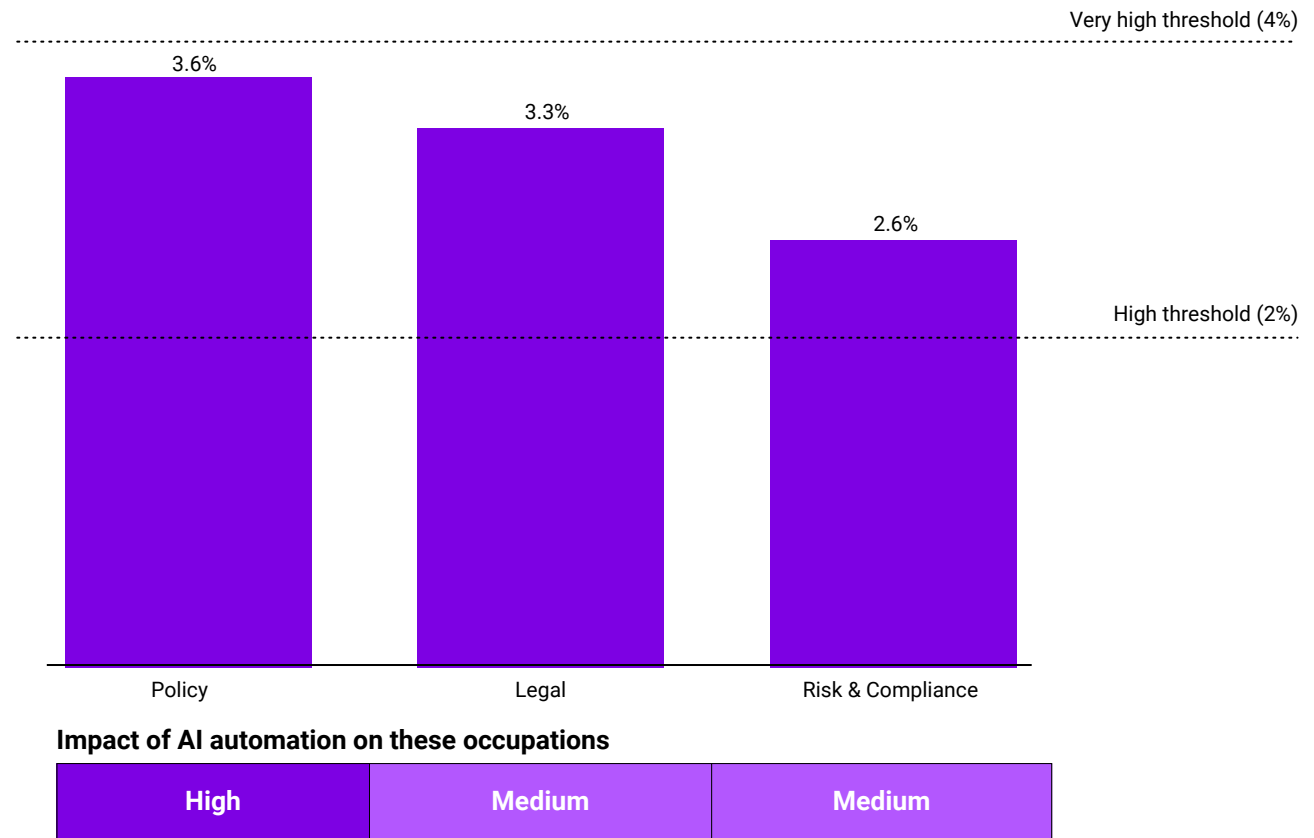
# GOVERNING

## Governing occupations are facing high shortages, but we expect that AI automation and augmentation may help alleviate these to some degree going forward

Vacancy rates provide an indication of the amount of unfilled jobs thus potential supply shortages. The vacancy rates across governing function suggests that most are facing some degree of shortage, with all functions seeing high vacancy rates relative to the whole workforce.

Encouragingly, the impact of AI automation and augmentation on these occupations is mostly correlated with the degree of shortage. This means that some automation and augmentation may help alleviate existing shortages and provide greater opportunity for people to move into areas, like AI jobs, with rapidly growing demand.

**Vacancy rates**  
2023



Source: ABS; Tech Council of Australia

# GOVERNING

## Governing occupations are seeing strong growth in entry level talent across the economy suggesting strong future supply

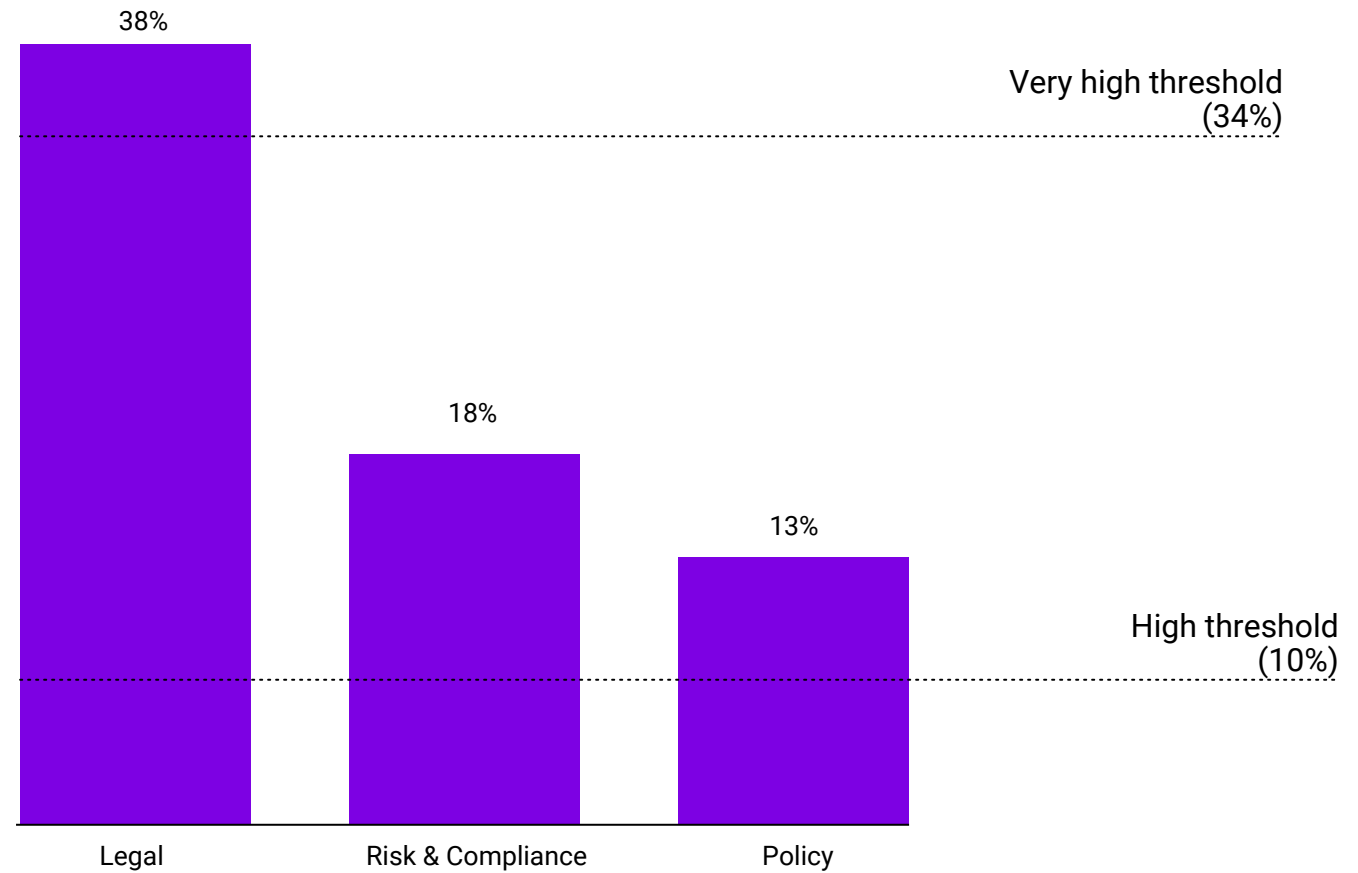
Strong growth in entry level talent is an essential component of building our future workforce. Across the AI governing functions there has been strong growth in entry level employment. This is proxied by the number of people aged 20-24 years old employed in these occupations across 2016 and 2021 across the economy.

Legal occupations have seen the highest entry level growth across this period. This is followed by Risk & Compliance and Policy roles, both of which are still above the economy-wide 'High' threshold.

The strong growth in employment of young people in these occupations across the economy suggests we have a good foundation to support future workforce growth in these areas.

## Growth in employment of young people

Growth in number of people aged 20-24 years old, employed, 2016 - 2021



Source: ABS

# GOVERNING

## University training is the norm for most Legal and Policy roles, and we could see greater diversity in training options for Risk & Compliance

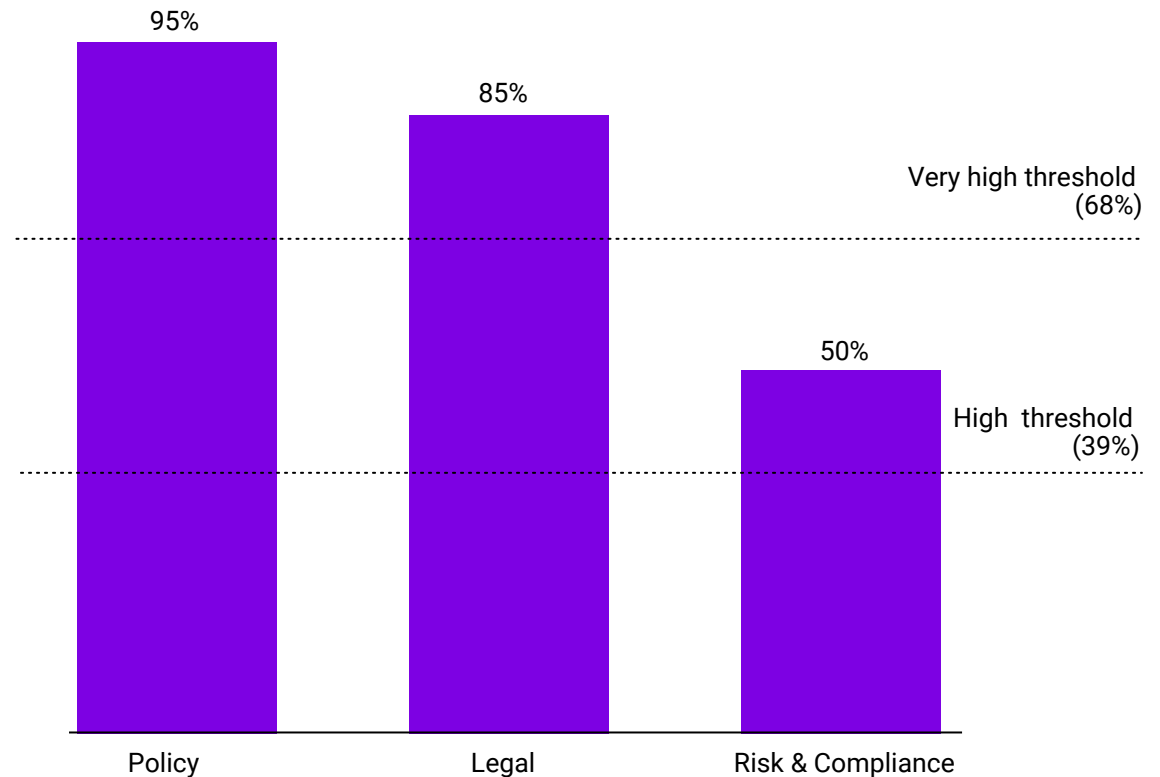
AI Governing occupations are biased towards University training as a group. This is fairly consistent between 2016 and 2021, and largely driven by long-term structural factors such as the regulation of occupations that account for a large share of workers in this group (e.g. Solicitors) that require a university degree to become fully qualified.

Legal occupations are the most university-leaning, with 95% of people employed in these occupations reporting that a university degree is their highest qualification. There is a similar pattern within Policy occupations.

Risk & Compliance occupations have an even split between university and VET training. This function includes only one feeder occupation: General Managers. This occupation is employed across the economy and involves operational and planning skills that can be acquired through a range of training paths. As AI Risk & Compliance jobs emerge, we may see growth in alternative training pathways that reflects the distinct nature of these jobs. This would help the labour force respond as quickly as possible to rising demand and mitigate potential shortages.

### University degrees

Employment of workers in AI development feeder occupations, 2021

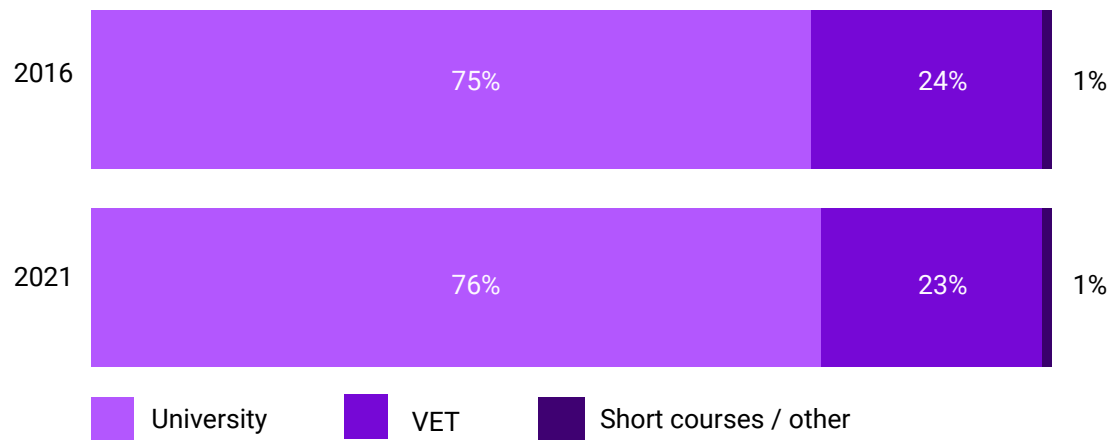


Note: The thresholds provided on each chart displayed on this page represent the economy-wide quartiles of the distribution for each qualification type, with medium being the 25th quartile, high the 50th and very high the 75th.  
 .Source: ABS

# GOVERNING

## Growth in employment by qualification level

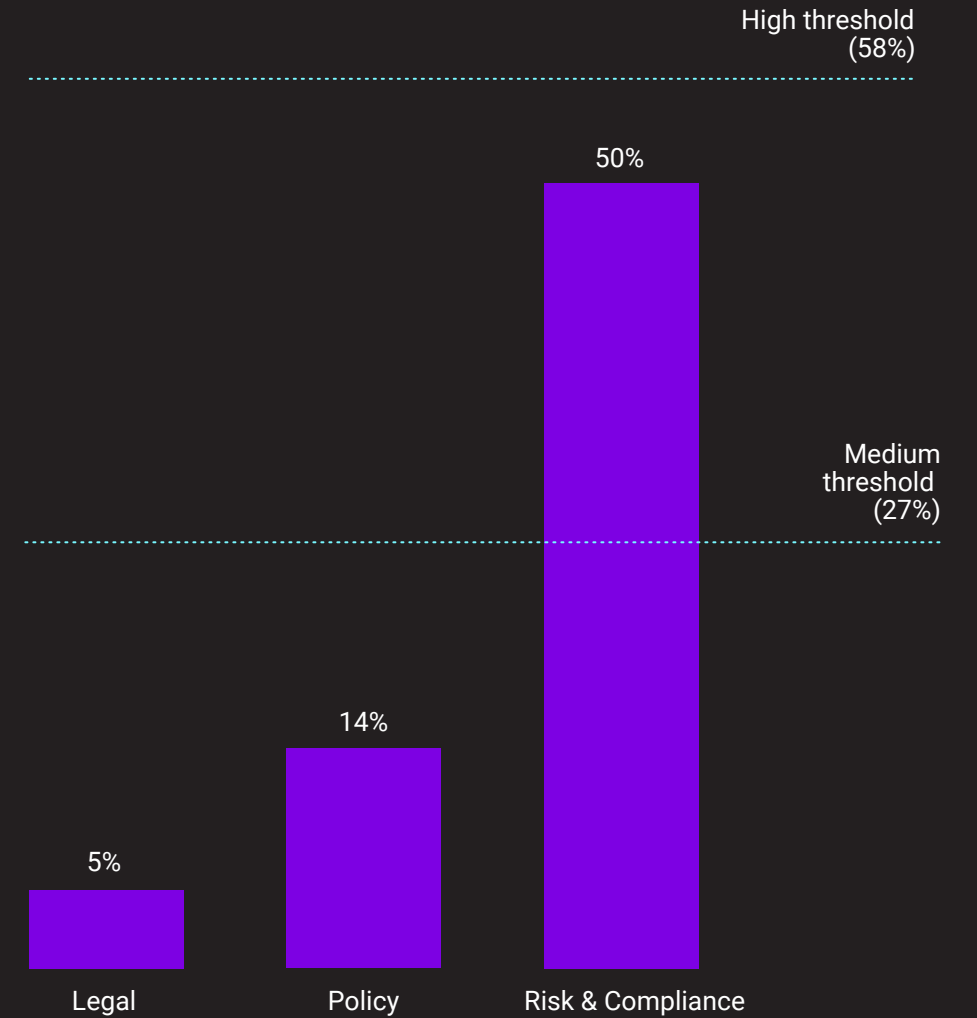
Growth in employment<sup>1</sup> by highest level of qualification, workers in high and medium skill match occupations, 2016 - 2021



Note: The thresholds provided on each chart displayed on this page represent the economy-wide quartiles of the distribution for each qualification type, with medium being the 25th quartile, high the 50th and very high the 75th, Source: ABS

## VET qualifications

Employment of workers in AI development feeder occupations, 2021



# GOVERNING



**Lee Hickin**

AI Technology and Policy Lead  
for Asia



## Case study: new kinds of roles can bring together the best of technical and policy thinking

Lee was working as the Chief Technology Officer for Microsoft ANZ when he saw a gap emerging between AI governance and technology.

In the three decades he’s worked in the tech industry this gap has always existed to some degree, but it was becoming much wider with the adoption of AI. Seeing this gap grow motivated Lee to step into this role and tackle policy for the first time as the AI Technology and Policy lead for Asia.

“We needed a role that was designed to bridge the gap between governance and technology, to make sure that we equally consider the risks and opportunity that AI provides whilst understanding how the technology fundamentally works.”

Lee brings a strong technical expertise and business experience to this policy role. This enables him to help government ministers connect the dots between high-level policy thinking and the technical components of AI.

**“I have this role (and perhaps roles before it in my career) not because of the things I know but because of the way I contribute and share that knowledge. I am a big believer in the idea that your value is not defined by you – it’s is defined by the value you give to others.”**

His role also sees him engage with businesses by helping CEOs and C-suite colleagues shape internal governance frameworks that enable the business to make the most of AI while managing risk effectively.

“This is complex and difficult to navigate work but its critical to our business to ensure that we are demonstrating our investments in Responsible AI as much as we are advocating for our technology and its business value.”

With AI technologies developing and commercialising rapidly, part of Lee’s role is researching and learning about the technology as it’s happening.

This is the most important thing that people can do to be successful in tech, according to Lee: Always being willing to learn something new and accept when you’re wrong.



**The AI Jobs Opportunity**



**Developing Occupations**



**Scaling Occupations**



**Governing Occupations**

**Managing Occupations**



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# MANAGING OCCUPATIONS

## Scaling AI capability for senior management talent is primarily about upskilling people already in, or progressing towards these roles

Employers are reporting that training for senior management primarily focuses on ensuring they have sufficient AI literacy – there aren't current or expected shortages in the supply of people for most senior management roles. The exception is in roles requiring deep technical experience or in areas that are niches for Australia (such as scaling deep tech companies) but have large talent pools overseas.

For senior management pathways, companies developing and deploying AI systems are prioritising this training to ensure that their senior management has the context to lead effectively. This includes understanding the risks as well as the opportunities. As highlighted by the UTS Human Technology Institute, AI governance is also an important area for capability development at the Board level. To build greater AI literacy and capability among business leaders, the Australian Institute of Company Directors has released a new suite of resources developed in partnerships with the UTS Human Technology Institute.

Many large organisations are customising their own training. This is particularly common when they have very specific applications of AI, for instance, in financial services. It's important to note that while this approach may work well for larger organisations, it may not be cost-efficient or feasible for smaller organisations.

The good news is that there is good training available for smaller organisations, either through relatively accessible online courses from vendors and the 'Introduction to Artificial Intelligence' microskill course provided by the National AI Centre (NAIC), coordinated by the CSIRO and the IATD.

Upskilling senior management requires formal training alongside coaching and practical experience which has commonly be found through experience in US tech firms but also increasingly comes from experience in successful Australia-originated companies.

### The role of US tech firms in upskilling the Australian tech workforce



**1 in 5**

Experienced tech workers will have worked at a US tech firm by 2030



**4000**

Experienced tech workers will have worked at a US tech firm by 2030



**1 in 2**

Of Australia's successful startups were started or scaled with experienced US tech talent



**\$2.2B**

The economic contribution of US tech alumni to Australia each year

Source: Tech Council of Australia & Microsoft (2023) Harnessing the Hidden Value  
 Source: UTS Human Technology Institute (2023), The State of AI Governance in Australia





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## We're likely to face different challenges in meeting demand for AI workers in each skill group

Greater AI development and adoption could create up to 200,000 jobs in Australia by 2030. However, without significant change, we're unlikely to fulfil that jobs opportunity.

Within AI **development** jobs, established supply pathways are unlikely to grow as fast as demand. Given many of these occupations are already in shortage, we may face shortfalls of skilled workers in these areas. Encouragingly, very high rates of upskilling in the tech workforce into AI roles means that we're not expecting a significant challenge in responding to job requirement changes – where there is enough people to fill those roles

For AI **scaling** roles, rapid growth in demand from tech may make us a larger employer of people in these occupations off a relatively low base. Given existing shortages, there is limited scope for these occupations to meet extra demand but AI adoption by people in these roles may increase efficiency and mitigate potential shortages. With minimal job requirement changes, we do not believe responding to these changes will be a significant challenge if there's a broad AI literacy uplift across the Australian workforce.

AI **Governing** roles are unlikely to see shortages, but responding to the job requirement changes may be a challenge. The shift for people in legal and policy roles is substantive and will likely require formal upskilling, plus opportunities to gain experience in AI-intensive roles. For risk & compliance roles, there is the opportunity to establish alternative pathways (other than University degrees) into these occupations. This will help mitigate shortages and expand the paths for people to join this part of the tech workforce.

An uplift in strong AI literacy will be essential for AI **Management** roles. This type of upskilling is already underway in many large organisations while high-quality online courses will be essential to ensuring small and medium businesses have access to this training. It's important to note that experience in organisations with relatively advanced approaches to managing AI will be a crucial aspect of upskilling this cohort. This is most likely to come from multinationals with a presence in Australia, large Australia-originated companies, as well as Australians overseas and skilled migrants attracted to Australia.



**While reform is necessary in some key area, proven practices that are working well within industry, education and training systems should continue**

## Development

- **Skills-based talent practices.** This has made it possible for most large tech employers to efficiently support their staff to upskill through identifying the marginal change required.
- **Upskilling** is reportedly very high within tech occupations. This will enable many workers with the closest match to AI jobs to upskill quickly and meet this demand. To the extent we need to 'backfill' their current roles, employers may need to expand retraining programs for non-tech workers into tech roles.
- **Development of retraining programs.** There are several successful retraining programs into tech roles that have been developed and piloted in recent years. For instance, the IATD Digital Cadetship Program profiled in this report. Successful programs should receive support to scale and meet greater demand.
- **Migration reform** that removes occupation lists for the Specialist Skills Pathway. This will enable employers to support highly-skilled, experienced workers from larger overseas talent pools in new areas to move to Australia and help upskill our local workforce, this may also have implications for similarly specialised positions requiring experience in the governance skill area.

## Scaling

- **Transitions into tech** over the last few years we've seen the workforce grow rapidly and that's included high growth across many scaling occupations.
- **University pathways** are the mainstay training route for many of these occupations, though that is sometimes due to occupation regulation (e.g. CPA/CAs for Accountants). Across the breadth of these occupations, there could be more opportunities to meet rising demand through other training pathways, such as the VET system or short courses.

## Governance

- **Transitions into tech.** These occupation have seen significant growth in employment within tech which suggests that we're on a good path to continued growth. However, with relatively inflexible training and development, this recent trend may not experience issues in scaling.

## Recommendations

- 1. Expand and diversify retraining pathways:** Enhance VET and short-course offerings to quickly adapt to changing skills demands across AI jobs and ensure they remain industry-relevant. This should include expanding existing offerings that have proven effective, co-designing new pathways or offerings with industry, embedding industry credentials / training where appropriate, and implementing Modern Digital Apprenticeship programs at federal and state levels. Diversifying pathways is particularly important for people retraining mid-career into areas with greater expected shortages and larger skills changes such as Engineering and will be instrumental in improving diversity in the tech workforce.
- 2. Promote awareness of AI jobs and skills needs:** While it's essential to understand and address the potential impacts of AI on current occupations, we need to have an equal focus on ensuring domestic supply of AI-skilled workers meets demand in the economy to avoid future labour market shortages. This requires us to enhance awareness of the job opportunities AI creates and support Australians to understand training and career pathways.
- 3. Promote AI literacy across the workforce:** Support widespread training initiatives to boost AI literacy across the workforce, ensuring that the workforce is prepared for a future where AI adoption is widespread. This needs to include action to upskill senior management in AI governance and adoption.

**Reform skilled migration:** The skilled migration reforms underway are crucial to ensuring that we can competitively attract global talent with faster visa processing and the removal of occupation lists. The removal of occupation lists will be particularly impactful for the AI workforce, in which many occupations may emerge much faster than official statistical systems can keep up.

**Develop a comprehensive AI Investment and Capability Plan for Australia:** the development of specific skills-based initiatives should be undertaken as part of a broader and more comprehensive plan to grow AI capability in Australia. Such a plan should also include measures around investment, regulation and governance, digital infrastructure, research and commercialisation and positioning governments as an exemplar.

### KEY

- **Government role**
- **Industry role**

This key reflects where government and/or industry have a substantial role to play in the recommended initiatives. This highlights the importance of strong government-industry collaboration in supporting growth of the AI workforce.



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## Appendix I: Estimating the number of AI workers in Australia

The number of AI workers in Australia stated in this report is a composite of existing estimates from the CSIRO Artificial Intelligence Roadmap and new/updated estimates produced for this report. The author of each estimate is laid out in a table on this page.

### Estimating the 2023 tech occupations figure

To estimate the number of people in tech occupations working directly on AI, we used:

- The earlier figures (2014 and 2019) from the CSIRO as the base
- LinkedIn data on 'AI talent concentration by country' provided through the OECD.AI Policy Observatory as the trend. This series provides the percentage of LinkedIn users in a country with AI skills or those working in an AI occupation. In this instance, LinkedIn defines 'AI skills' and 'AI occupations' as those in Engineering/tech occupations.
- We note that the trend in the LinkedIn data aligns with the trend inferred from the CSIRO 2014 and 2019 figures, for the period that these two series overlap.

### Estimating the non-tech occupations figures

- We used the ratio of tech:non-tech occupations identified in the TCA Tech Jobs Update 2023 report to estimate the number of non-tech workers in AI

### Author of estimates

Year	Tech occupations	Non-tech occupations
2014	CSIRO	TCA
2019	CSIRO	TCA
2023	TCA	TCA
2030	CSIRO	TCA

## Putting the growth rate in context

We have also calculated the economy-wide threshold for very high growth (75<sup>th</sup> percentile) across all the occupations forecasts provided by Jobs and Skills Australia at the four-digit ANZSCO level. This very high growth threshold is 13%. Based on this context, we have developed a five-point qualitative rating for demand growth starting with 'Low', then 'Medium', 'High', 'Very high' and 'Extremely high'.

## Appendix II: Feeder occupations

Feeder occupations, which include high and medium skill match occupations, are identified using data analysis, results from existing research and consultation with employers. We identify these occupations and include them in the analysis of skills supply to understand the fuller potential of the Australian labour force to fill AI jobs, rather than only looking at the existing tech workforce.

To identify these feeder occupations, we:

1. Mapped each AI occupation in the AI Jobs Taxonomy (in this report) to an equivalent base O\*NET occupation
  2. Estimated the skills similarity by identifying occupations that shared similar tasks to the base occupation
  3. Converted the potential feeder occupations identified in (2) from the O\*NET system to ANZSCO, and removed any duplicates created through this mapping in the ANZSCO list of potential feeder occupations
- Finalised the list of feeder occupations and their high/medium skill match ratings from (3) based on previous research and expert consultations

Note: A skills similarity rating greater than 80% is High, between 50% and 80% is Medium and below 50% is Low

## Appendix III: AI Jobs Taxonomy (1/3)

AI skills group (TCA)	Function (TCA startup jobs taxonomy) <sup>1</sup>	Occupations	High skill match	Medium skills match
Developing	Engineering	Machine Learning Engineer / AI Engineer; Software Engineer	Software and Applications Programmers	
		Prompt Engineer	Journalists and Other Writers	
	Cybersecurity	Information Security Officer	Database and Systems Administrators, and ICT Security Specialists	Computer Network Professionals; ICT Support and Test Engineers
	Data	Data Scientist	Actuaries, Mathematicians and Statisticians;	Archivists, Curators and Records Managers; Surveyors and Spatial Scientists
	Product	Product Manager	ICT Managers	Contract, Program and Project Administrators; Mining Engineers
	Design	Product Designer	Graphic and Web Designers, and Illustrators	Multimedia Specialists and Web Developers
	IT Operations & Architecture	Business Analysts / Solution Analysts / Architects	ICT Business and Systems Analysts	Telecommunications Engineering Professionals

## Appendix III: AI Jobs Taxonomy (2/3)

Function (TCA startup jobs taxonomy) <sup>1</sup>	Occupations	Feeder occupations
Sales	Customer Success Manager; Customer Experience Manager	ICT Sales Representatives; Sales Representatives
Marketing	PR & Comms Manager; Product Marketing Manager; Content Manager; Growth Manager	Advertising, Public Relations and Sales Managers; Real Estate Sales Agents; Conference and Event Organisers; Health and Welfare Service Managers; Technical Sales Representatives;
Operations <sup>1</sup>	Operations Manager; Office Manager	Secretaries; Aquaculture Farmers; Café and Restaurant Managers; Transport Services Managers; Couriers and Postal Deliverers; Funeral Workers; Caravan and Camping ground Managers
Finance <sup>2</sup>	Financial Planner; Credit Manager; Accountant	Accountants; Financial Investment Advisers and Managers; Finance Managers; Financial Brokers; Credit and Loan Officers; Research and Development Managers; Manufacturers
Human Resources	Talent Acquisition Managers; L&D Managers	Human Resource Managers; Human Resource Professionals; Training and Development Professionals
Customer Experience / Support	Customer Experience Manager	Call or Contact Centre Workers; Other Clerical and Office Support Workers; Receptionists; Insurance, Money Market and Statistical Clerks; Sales Assistants (General)

## Appendix III: AI Jobs Taxonomy (3/3)

AI skills group (TCA)	Function (TCA startup jobs taxonomy) <sup>1</sup>	Occupations	High skill match (if more than one, the first is the reference for matching)	Medium skills match
Governing	Legal	Domain-specific lawyers	Solicitors;	Court and Legal Clerks; Judicial and Other Legal Professionals
	Policy	Policy Manager; Domain-specific regulatory affairs managers	Policy and Planning Managers; Intelligence and Policy Analysts	Other Specialist Managers; Other Natural and Physical Science Professionals; University Lecturers and Tutors
	Risk & Compliance	AI Safety Officers	General Managers	Construction Managers
Managing	Executive General Managements	CEOs/CIOs/CTOs	CEO and Managing Directors	





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