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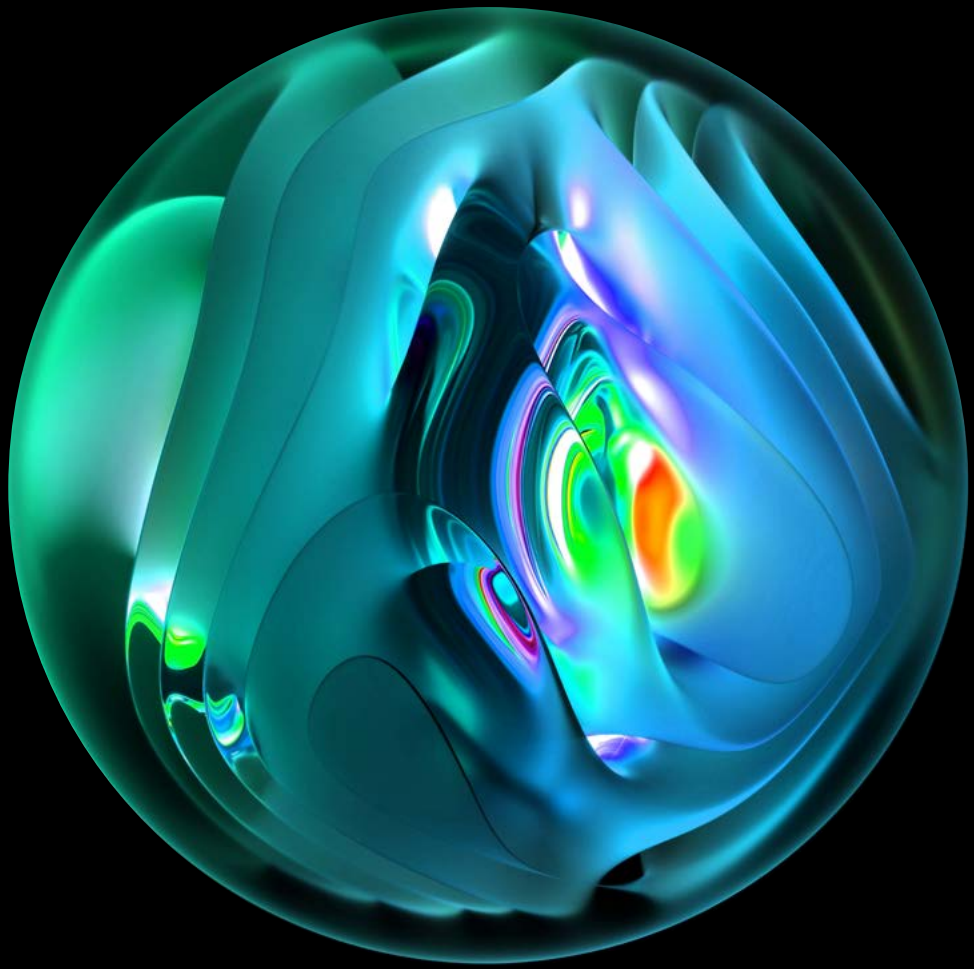


Australia's Digital Pulse

A new approach to building technology skills

Tasmania edition

Deloitte
Access Economics

Powering Australia's technology brilliance.

ACS is the professional association and largest community for Australia's technology professionals, with more than 47,000 members across business, government and education.

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

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

Community

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

47,000+
Total members

12,000
Event attendees a year

Career

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

46
Accredited universities

368
ACS Google Scholarships

Capability

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

11,128+
Learning Accelerator unique users

44,000
Digital resources

Migration

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

40,200
Skilled migrant applicants in 2022–23

7,107
ACS Professional Year graduates in 2022–23

ACS Australia's Digital Pulse 2023

Tasmania edition

The digital economy is an important industry for Tasmania, contributing $1.1 billion to the economy. Critical technologies including artificial intelligence, advanced data analytics and virtual worlds will have a profound impact on technology sector and broader economy. Their rapid adoption will affect 270,000 Tasmanian workers and require a tripling of the number of critical technology skills currently in the workforce by 2030.

Already outdated digital skills cost Tasmanian businesses $51 million per year. This estimate only reflects costs associated with existing employees, with the full opportunity from digital technology likely to be much larger. Building the tech skills needed in Tasmania will require a new approach and the education of new and existing workers.

Key principles of the new approach

All hands on deck

Skills first

Driving diversity

Lifecycle of learning

Systems approach

$3.2 billion

Projected annual technology investment in Tasmania in 2030

270,000

Tasmanian workers who will need some reskilling because new tech will affect at least 95% of work time

8,600

critical tech skills needed in Tasmania by 2030

$51 million

Cost of outdated digital skills for large Tasmanian businesses each year

Technology supporting growth in Tasmanian economy

Technology plays an important role across Tasmania

The Tasmanian ICT sector is a growing sector, with innovative local businesses. The ICT sector contributed $1.1 billion to the Tasmanian economy in FY22 as measured by value add with over 1,600 ICT businesses that have headquarters in the state.[1, 2]

The importance of digital technology extends across the whole economy. Consider the following:

- The Tasmanian technology workforce reached 11,000 in 2022, with more than half employed in businesses outside the traditional ICT sector.
- Technology businesses support Tasmanian trade with two thirds providing products or services to interstate customers and a third exporting internationally.[3]
- The ICT sector is spread across the state with over 40% of technology businesses being headquartered outside of the Hobart area.[4]
- The Tasmanian economy will experience imminent and extensive disruption from Generative AI with the five industries to be impacted the most by the technology accounting for 33% of the economy.[5]

More broadly, forecasts from the International Data Corporation (IDC) indicate that technology investment in Tasmania will increase from $2.3 billion in 2022 to $3.2 billion by 2030.

The importance of innovating and adopting new technologies to Tasmanian businesses and economy cannot be understated. However, beyond economic outcomes, embracing technology will provide significant dividends for all Tasmanian's.

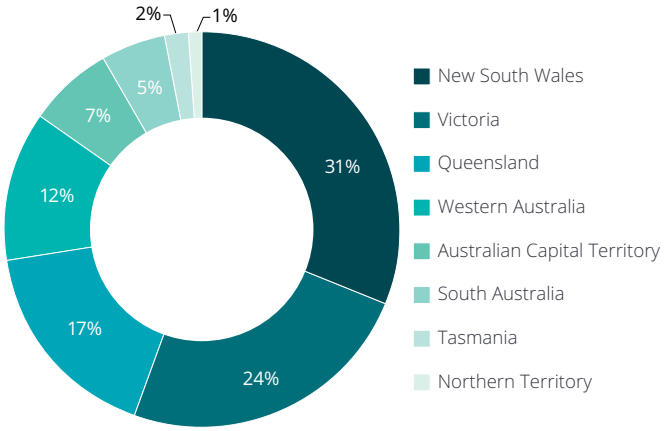
Technology can play an important role in addressing the cost-of-living crisis. For example, energy smart meters utilise technologies including internet of things (IoT) to give consumers better information regarding their electricity use. This allows consumers to make more informed decisions and save money.

Similarly, technology can assist the government improve service delivery and reduce costs. For instance, AI-powered systems can enhance the efficiency and targeting of social support programs by automating eligibility assessments, identifying process improvements for service delivery and the improving service delivery with chatbots.

Technology is also likely to play a role in helping Tasmania reach its 200% renewable energy target. AI and big data analytics can help harness the power of technology to boost efficiency and accelerate innovation. Already, generators and retailers across the world are applying more than 50 different uses of AI in the energy system.[6]

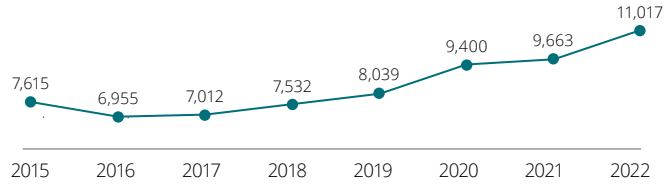
With tech offering solutions to some of the biggest issues facing the state, Tasmania cannot afford to let the opportunities of developments in tech go by.

National technology investment to 2030



Source: IDC ICT Spend Data Custom Report

Technology employment in Tasmania 2015 to 2022



Source: Australian Bureau of Statistics (2023)

An ethics perspective

"Tasmanian businesses are increasingly reliant on advanced technology like AI or big data analytics and while we often focus on the skills required to operate these technologies, the ethical considerations are often considered secondary. This is a mistake."

Having a clear understanding of ethical applications of these technologies is central for workers using them to use them appropriately and for businesses to maintain a social licence with customers and the community."

Anna Sawyer
Director
Deloitte Australia

Critical technology will significantly impact the work of 95% of the Tasmanian workforce

270,00 workers across Tasmania will be impacted by critical technology

To begin preparing for the incoming disruption, the Australian Government has developed the *List of Critical Technologies in the National Interest*. The latest edition of *ACS Australia's Digital Pulse* analyses the impact of eight key technologies from this list including AI, additive manufacturing, advanced data analytics, advanced robotics and sensors, cyber security, enabling cloud technology, Internet of Things and virtual worlds.[1]

To assess the skills needs for these critical technologies, Deloitte Access Economics has analysed a 2,136-task taxonomy of 229 Australian occupations from the National Skills Commission (NSC) and academic research on the impact of these technologies on tasks to understand the potential impact of the critical technologies for the Australia workforce.

This analysis shows that almost all Tasmanian workers (95%) are expected to have at least 20% of their work time affected by critical technologies over the coming years. In total, 70% of all working hours across Tasmania will be affected.

Advanced data analytics and AI Technologies will have the largest workforce impact, each affecting the work time of more than half of all workers. In total, these technologies will affect 27% and 23% of all working hours in Tasmania, respectively.

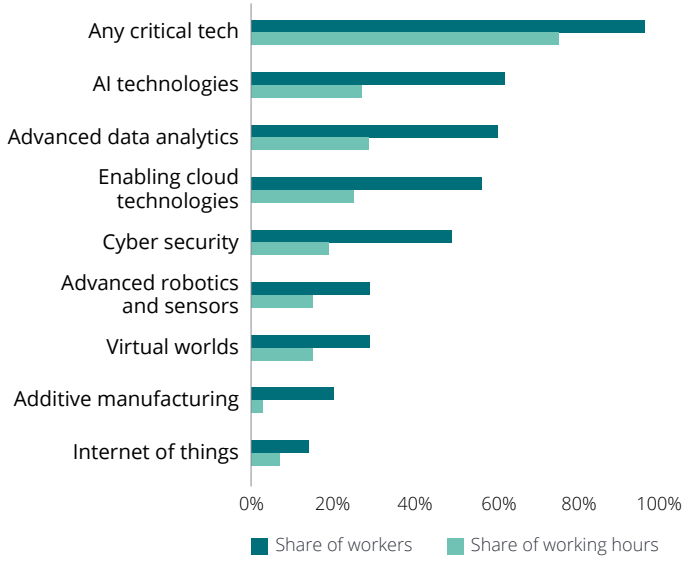
While a broad range of workers will be impacted by critical technology, some jobs face greater changes in skills than others.

Occupations most affected by critical technology include technology workers who account for eight out of the top twenty impacted occupations. For Tasmania, which already has several technology-based jobs on its skill shortages list, this reinforces the need to think strategically about how to upskill existing technology workers.

Occupations less exposed to the previous wave of technological change will also be significantly affected by critical technology. For example, registered nurses and teachers will have more than 60% of their work time impacted. Despite having substantial physical components that are less likely to be impacted, administrative and cognitive tasks within these occupations are likely to be made more productive or change entirely. Tasmania, with a proportionally high share of its workforce employed in these occupations, will have a larger task than most to navigate change in these occupations.[2]

Manual labour-intensive occupations such as those in hospitality and construction trades are expected be less exposed to critical technology. Nevertheless, strategies to upskill workers in these areas will also be important and need to account for the lower level of digital skills of these workers.

Proportion of Tasmanian workers and work hours affected by critical technology



Knowledge and traditional industries will have more than 80% of work time impacted

Eight Tasmanian industries will all have at least 80% of their work time affected by critical technology

A broad range of industries are expected to be affected by critical technology including knowledge industries like public administration and safety, other service-based industries like retail trade. Collectively, the top eight impacted industries account for 75% of the Tasmanian economy in 2022.

The highly codified information within existing digital infrastructure alongside a highly skilled workforce means that knowledge industries like financial, professional and information services are likely to experience some of the most significant impacts from future waves of critical technologies like data analytics and AI.[1, 2]

Traditional and primary industries are also facing seismic disruption from critical technologies and may be less prepared for the rapid incoming changes. Research assessing the data infrastructure of industries has found lower capabilities in primary industries compared to other sectors of the economy.[3]

Agriculture is one of Tasmania's largest industries. As such, the use of AgTech will be essential to raise economy wide productivity.[3] Tasmanian start-ups are already developing AgTech solutions with critical technologies. For example, *Bitwise Agronomy* produces software that combines computer vision and machine learning to count and measure components of horticultural crops and forecast yields.[4]

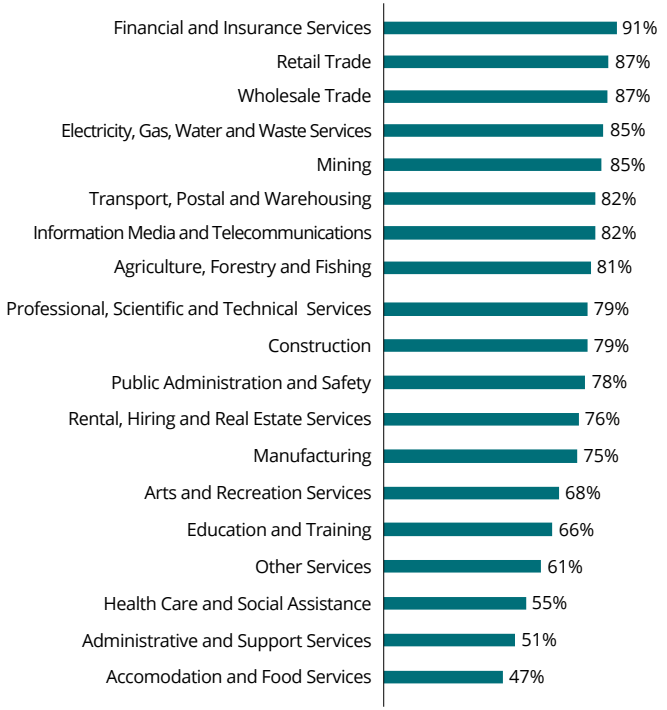
The agricultural sector and government recognises the importance of critical technology. Already, a number of groups exist to raise awareness and promote uptake. This includes the Tas Farm Innovation Hub and Tasmanian Agricultural Productivity Group.[5]

The impact of critical technologies will be significant for education and health care. Both industries will have around 60% of all hours worked affected by critical technology. With over 25% of the Tasmanian workforce employed in these two sectors, critical technology is likely to disrupt the skills and tasks needed for Tasmanian workers in the future.

Examples of how critical tech might be used in the classroom include Hobart-based EduTech start-up *TeacherAide* which recently launched AI power tools for teachers.[6] Their tools provide a user-friendly interface to develop rubrics, questions, lesson plans and answer questions all based on the Australian Curriculum. Innovations such as these will allow teachers to spend less time on routine aspects of their role, improve the personalisation of material and allow them to spend more time improving educational outcomes.

With the impacts of critical technology being felt across all industries, competition for workers with critical technology skills will likely be significant. A focus on upskilling the existing workers in industry specific applications will, therefore, be key.

Affected work hours by industry, Tasmania



Source: Deloitte Access Economics analysis of ABS Census (2023)

The critical tech skills challenge for Tasmania

Tasmania will need critical technology skills to triple by 2030

The number and type of skills needed for the technology workforce in 2030 will look vastly different to those in use today. In total, 8,600 skills will be required for critical technologies by 2030, an increase of 6,200 compared to current skills within the Tasmanian workforce.

The greatest increase in skills demanded will be for those people skills needed by most workers such as communication, teamwork and problem solving. Scripting languages and software development principles are among the most common technical skills that will be needed in Tasmania.

The current need for digital skills is not being met. Previous Deloitte Access Economics research suggests that three in five businesses lack the digital skills they require to do business.[1] These out-of-date digital skills come at a cost with $51 million per year in lost output among large businesses alone.2 This estimate only reflects costs associated with existing employees, with the full opportunity from digital technology likely to be much larger.

With seismic developments occurring in technology, the potential for rapid change in the skills required across the Tasmanian workforce means the gap in digital skills is likely to grow without significant action. To ensure that Tasmania's technology skills challenge is met, the state must attract and retain highly-skilled technology workers, and overcome labour market barriers.

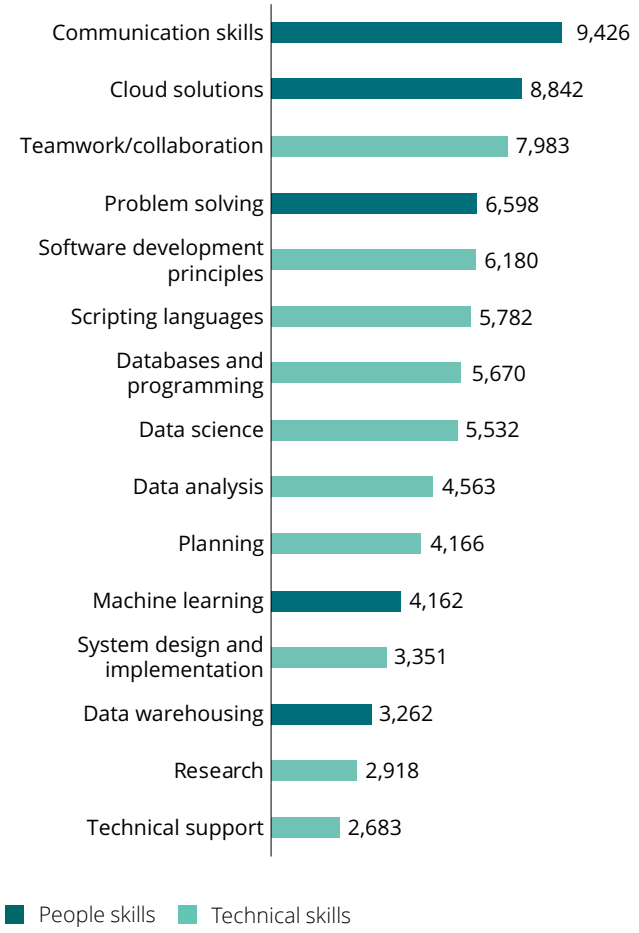
A lack of diversity in tech not only holds back key talent but severely limits the ability to meet our skill needs. While Tasmania fares better than all other states when it comes to training women in tech, the share of **women enrolled in IT university courses remains low at 36%.[3]** There is also difficulty with translating those studying IT to labour force participation with Tasmania having a low share of women working in technology occupations (28%).[4] This is substantially lower than in comparable industries such as professional services (47%).[5]

Despite a slight uptick in 2021, generally decreasing domestic student completions of IT degrees signals an **increasing lack of interest in tech among younger generations.[6]** This could contribute to future generations lacking critical skills needed to build a successful career.

Not only will Tasmania need more workers with technology skills, but it will also need workers with a variety of new or emerging technology skills. Skills to work with AI will be some of the most sought after with AI skills being the largest growth area through to 2030. These include technical skills such as data science, machine learning and deep learning (see page 9).

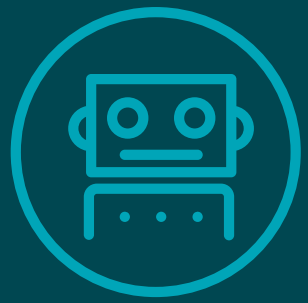
Building these skills needs a new approach with **less than half (49%) of current technology workers believing their formal education has equipped them with the skills they need** for critical technology.[7]

Additional skills needed by critical technology workers by 2030, Tasmania



Source: Deloitte Access Economics analysis of ABS Census (2023)

2030 skills for Artificial Intelligence, Machine Learning and Natural Language Processing



One of biggest areas of additional skill requirements will come from Artificial Intelligence (AI), Natural Language Processing (NLP), Machine Learning (ML). Annual business investment across Australia in these areas is forecast to jump from less than $5 billion in 2022 to over $27 billion by 2030. Business use of these technologies across Australia will grow from less than 1% in 2022 to almost two-thirds by 2030.

What skills will tech workers need for this enormous change?

Already, we know that the essential technical skills include: Data Science Principles, Data Analytical Thinking, Programming, Scripting Languages, Machine Learning, and Software Development Principles. Workers will also need soft skills such as planning, research, problem-solving, effective communication, collaboration, and teamwork.

How many extra professionals and how much more skilling will be needed in Tasmania?

The number of Tasmanian tech workers focusing on AI, ML and NPL is expected to grow from just 58 in 2022 to 520 by 2030.

The total skill requirement in Tasmania to support just the core tech workforce is projected to grow 793% from 252 in 2022 to 2,247 in 2030. The gap between skills now and in the future is a staggering 1,996 technical and soft skills.

The introduction of these new technologies will also give rise to new job roles, including positions such as AI Ethicist, AI personality designers, algorithm bias auditors, information validators, and AI regulatory roles.

Skills sets demanded for AI, NLP, and ML by 2030

- **Data science** 314+
- **Machine learning** 236+
- **Data analysis** 115+
- **Scripting languages** 222+
- **Data warehousing** 106+
- **Databases & programming** 129+
- **Software development principles** 162+

500 **Skilled workers needed** (2030)

2,000 **Skills gap** (2030)

+793% **Growth in skilled workers** (2022–2030)

People skills

Teamwork/collaboration	484+
Communication skills	561+
Problem Solving	397+
Research	193+
Planning	250+

Extra skills identified

- Ethical and responsible use of AI
- Critical thinking
- Linear Algebra and Calculus
- Machine Learning
- Deep Learning

Source: Deloitte Access Economics analysis based on Lightcast (2023) & IDC (2023)

Tasmania's technology workforce challenge

Tasmania needs technology workers with the right skills

Based on currently available data, Australia will need to spend an additional $92 billion through to 2030 on critical technologies to be at the forefront of forthcoming disruption. Based on forecast technology investment, this would amount to an additional $1.5 billion of critical technology spend in Tasmania by 2030.

To realise the gains from investment in critical technology, Tasmania needs enough skilled workers to make the most of the technology. While 11,000 people were employed in the Tasmanian technology workforce in 2022, our forecasts suggest an additional 3,000 workers will be required by 2030 to keep up. Under business-as-usual conditions, we estimate Tasmania will require 13,741 technology workers by 2030.

A 2022 survey of Tasmanian technology business found half believe the largest barrier to growing their business is an inability to attract suitable staff. The types of skills businesses need but cannot find enough of include cyber security, cloud computing, user experience design, software development and AI skills.

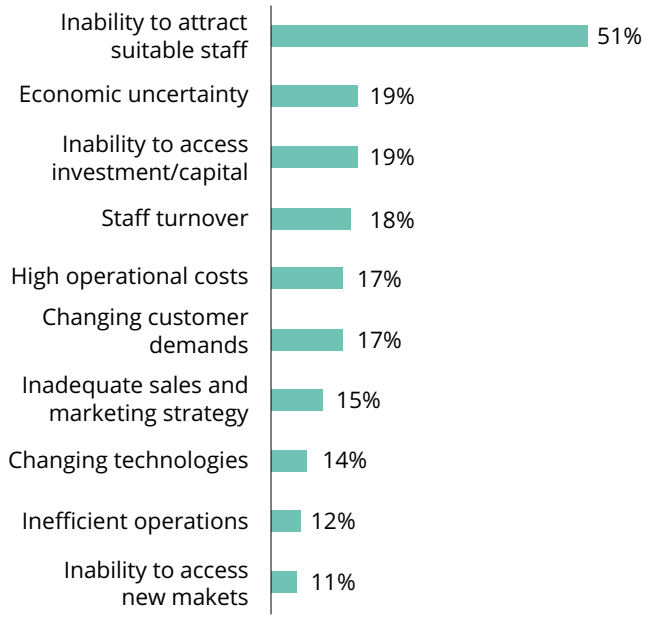
With a quarter of technology workers planning on leaving the sector in the next five years, skills shortages will remain a challenge. Tasmania must focus on keeping the technology workers it has. Top reasons for wanting to leave the tech sector include wanting to do something different (35%), for better pay (25%) and a lack of growth opportunities (21%).

Comparatively high interstate migration from Tasmania makes the issue more pressing than for many other states. Workers who develop a skillset in Tasmania and then leave for high-paying opportunities interstate is an important driver of skill gaps for mid-career professionals.

A focus on better utilising existing technology workers could also overcome skill gaps. Based on a technology workforce survey completed for this report, one in five workers do not agree that their skills are being fully utilised. Across Australia, workers think that they could have their capabilities and contributions better recognised (47%), be given more technical tasks (48%) and be involved in bigger and more complex work (34%). Not only does underutilisation mean workers do not find meaningful full-time work commensurate with their skills, but it adds to the likelihood they leave the profession.

Many tech workers (39%) also want to work more hours. Addressing workers being stuck in a part-time role that underutilises their time and skills represents a key opportunity for meeting the needs of the future workforce.

Top barriers to growth among Tasmanian technology businesses



Source: Deloitte Access Economics (2022)

Building Tasmania's technology ecosystem

Making the most out of technology in Tasmania will require every part of the ecosystem to do their part

The Tasmanian technology ecosystem includes government, education providers and employers. Each component will be required to develop the required tech skills required for the future Tasmanian economy.

Government is an essential part of the technology ecosystem with the public administration sector employing over 1,000 Tasmanian technology workers, making it one of the largest employers of tech workers in the state. The Tasmanian Government is also one of the biggest users of ICT products in the state, currently undertaking large scale projects including a $475 million investment in digital health.[1, 2]

The Tasmanian Government has also made several recent investments to uplift digital services to improve user experience of digital government. This includes the ongoing development of a digital services portal for Tasmanians to access a range of government services through a single login to be launched this year.[3]

Despite progress, Tasmania remained last on Intermedium Digital Government Readiness and Maturity Indicator report in 2023, demonstrating significant work is still required.[4] One area for government to play a larger role is in setting the agenda and providing strategic leadership for the sector.

The *Tasmanian ICT workforce Action Plan 2020-2023* has recently been completed and the *Information Communication Technology Skills Compact* which is currently in development offers an opportunity to provide a fresh vision for the digital economy in the state.

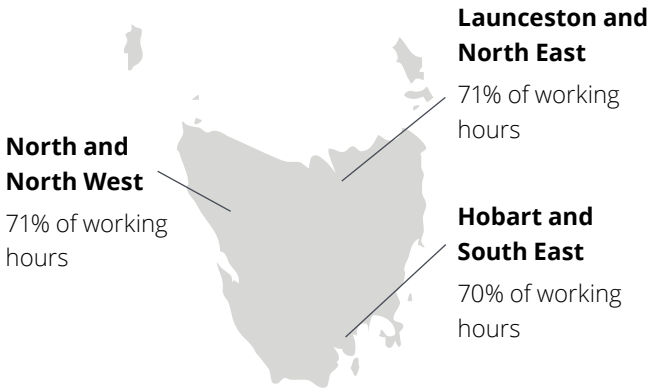
Ensuring Tasmania has a skilled technology workforce to take advantage of critical technologies is another key part of the technology ecosystem. Collaboration with industry and the education sector are key to making sure that technology workers are developing the skills that are required in the Tasmanian economy.

Tasmania must ensure that the benefits of technological progress are equitably distributed. According to the 2023 *Australian Digital Inclusion Index*, Tasmania has the lowest level of lowest levels of digital inclusion of any state (70 compared to the national average of 73).[7]

Further, the Tasmanian Council of Social Services' *Understanding Digital Inclusion in Tasmania* report found that the digital inclusion gap between high and low-income Tasmanians is increasing over time.[8]

With critical technology having a comparable impact across the state, not actively addressing barriers to digital inclusion risks widening gaps between groups as the technologies becomes commonplace in society and the workforce.

Affected worktime across Tasmania



A professional association perspective

"Building the technology skills Tasmania needs requires the support of the entire ecosystem. Professional associations, along with industry associations, education providers, government and businesses have a role to play now to make sure we have the required skills to leverage critical technologies by the end of the decade."

Josh Griggs
Interim CEO
Australian Computer Society

How can Tasmania lead change?

Tasmania needs to do more to ensure that the workforce develops the technology skills needed to meet the demands of business and the economy, while also prompting digital inclusion across the state. Currently, efforts are fragmented or operate in isolation. A concerted effort is needed to drive the development of the sector in Tasmania.

The conclusions of the Tasmanian ICT Workforce Action plan 2020-2023 provides an opportunity to present a new vision of building technology workforce skills in the state.

Addressing the skills issue will require a new approach to building tech skills in Australia and Tasmania. The latest edition of *ACS Australia's Digital Pulse* outlines five key principles needed to guide individual policies and initiatives. These principles are equally as relevant to Tasmania and below are some examples about how these principles should be applied within the Tasmania context.

Using these as our foundation, we have identified three high priority recommendations for Tasmania to kick start this new approach.

These recommendations align with multiple principles listed below and illustrate how solutions should and can bring about transformative change. The three recommendations are detailed in subsequent pages of this report.

01
All hands on deck

We need all actors across both private and public sectors to play a role in addressing the skills challenge in Tasmania. Combining effort to produce transformational change will be required.

In Tasmania this will require the Government to refresh its digital strategy to reflect contemporary needs and consider how critical technologies will impact the state.

02
Skills first

We have designed our education system to focus on people being ready for roles they could remain in for their entire career with limited reskilling or upskilling. We need to first and foremost identify and build in-demand skills based on critical technologies shaping the Tasmanian economy and society.

03
Driving diversity

We need people with the right skills. Excluding or not fully utilising existing talent is not only wrong but imposes significant costs on the Tasmanian economy.

Tasmania's ICT educations system has a greater share of women enrolled than any other state. However, continued efforts to driver diversity in the workforce are needed to help build skills and realising the benefits of the digital economy.

04
Lifecycle of learning

Building a culture of continual skills development is necessary in the face of a declining half-life of skills. In addition, the skill needs of the Tasmania workforce will change in unforeseeable ways as technologies interact, highlighting the need for continuous learning. For example, quantum computing may require a large increase in coding skills while Generative AI may streamline the need for in-depth knowledge of coding specific knowledge.

05
Systems approach

Too often we are working on solving the same problem in silos. Combining our efforts and thinking holistically about our networks, organisations and institutions is necessary to maximise the impact of our initiatives.

Turning the principles of the new approach into practice in Tasmania

Refresh the Tasmanian Government's Our Digital Future

There is an opportunity to develop a fresh vision for the digital economy in Tasmania. Existing strategies including the Tasmanian Government's *Our Digital Future and the Tasmanian ICT Workforce Action plan 2020-2023* have helped the state's digital ecosystem develop over recent years. Actions under these strategies have created initiatives to fill skill gaps and develop a detailed current capability scan of the Tasmanian digital sector.

Going forward, a refreshed approach is needed to build on these strategies and to consider the role that recent developments in critical technology will play in Tasmania. The Tasmanian Government's planned development of the *Information and Communication Technology Industry Skills Compact* represents an opportunity to define the new approach and co-design a path forward. Industry Compacts were recommended by the Premier's Economic and Social Recovery Advisory Council to identify immediate actions to address industry skills and training needs. The intention is that they help the training system be responsive to the needs of its users, accessible to all employers and learners, and deliver high quality training that the ICT industry requires.

The focus of the refreshed approached should continue to be on how digital transformation can assist the community, economy and government. Developing skills and attracting workers to the ICT workforce should be a key priority to ensure that Tasmania has the skills it needs. Importantly, targets and key performance indicators should be set for progress to be monitored and assessed against. More focus should be placed on reporting progress against goals within and outside of government.

A key component of the strategy refresh should involve coordinating action across the broader Tasmanian technology ecosystem – including universities, industry and professional associations and tech employers

Raising digital connectivity and inclusion

Tasmania has a significant opportunity to improve digital inclusion according to the Australian Digital Inclusion Index. Research from TasCOSS further suggests that the digital inclusion gap between high and low-income Tasmanians is increasing over time.[1]

Digital inclusion is essential for helping people access services, develop the skills required for modern society and to fully participate in the digital economy. It also helps to ensure that all Tasmanians have the opportunity to develop skills necessary for the digital workforce. Barriers in affordability, access and literacy must be addressed to raise level of inclusion.

The Tasmanian Government recognises this need and has initiated the development of a digital inclusion strategy to inform a broader program phase of work involving the community and industry in 2024.[2] To inform the development of this strategy a stocktake of regions and cohorts most in need of support should be undertaken.

Ensuring vulnerable Tasmanians have the baseline digital skills necessary to access increasingly digital government, social and business services is essential for living standards. Expanding the *Digital Ready for Daily Life Program* to a broader number of communities is one option for achieving this. Expansions should be guided by the stocktake of areas in need to prioritise investment.

As outlined in the *Premier's Economic and Social Recovery Advisory Council* final report, a lack of reliable state-wide digital infrastructure is another barrier to access that risks vulnerable Tasmanians being left behind. Since the release of that report, digital technologies look set to become even more important for modern life, emphasising the importance of taking action now. Continuing to work with the Commonwealth Government on funding or co-investment opportunities in this space is essential.

Supporting female founders in the start-up ecosystem

Increasing diversity in the technology ecosystem is essential for growing the number of skilled workers in the technology ecosystem. Currently only 28% of Tasmanian technology workers are women compared to 47% in comparable industries such as professional services. Despite Tasmania having the highest share of women enrolled in IT courses in the nation, representation remains low at 36%.

Tasmanian Government and education sector initiatives such as the *Women in ICT Program* and *UTAS Women in Technology Program* seek to address this imbalance by promoting professional opportunities and providing experience to women during the early stages of their IT education. Key figures in the local ICT sector have led a range of activities to promote cyber security specific ICT sector career opportunities and professional networks. For example, a Tasmanian Chapter of the Australian Women in Security Network was established in late 2022 and currently has around 60 members.

Programs such as the *Technical Pool Program* that are not specifically targeted at women nonetheless support pathways into the technology sector by upskilling and providing experience to female applicants.

To improve women's participation, more efforts should be directed to earlier in the education system. The national *ACS Australia's Digital Pulse* recommended student tech mentors at schools to mitigate the impact of gender norms impacting study decisions. This initiative could be impactful in the Tasmanian context and would require involvement across the Department of State Growth and the Department of Education, Children and Young People.

In particular, the alumnae of government and industry student or pathway initiatives who go onto work in the field could be suitable and interested in supporting younger generations by being mentors. Consideration should be given to how this could be implemented as part of new programs developed through the *Information and Communication Technology Industry Skills Compact.*

About this report

This report is a companion report to the ACS Australia's Digital Pulse written by Deloitte Access Economics for the ACS. As such, this report should be read in conjunction with the national ACS Australia's Digital Pulse, which can be viewed here.

This report, like the national report, focuses on eight critical technologies based on the Australian Government's List of Critical Technologies in the National Interest which identifies 63 key technologies within 7 fields that will have the greatest impact on Australia.

These critical technologies will profoundly impact the Tasmanian economy and labour market. This report has collated a variety of data sources to provide an analysis on the impact of these technologies on the Tasmanian tech workforce.

The research notes that while the technology workforce in Tasmania has grown strongly, there are risks to achieving the required growth in skills and people.

The analysis in this report is informed by the following data sources:

- Forecasts from the International Data Corporation (IDC) on investment spending in Artificial Intelligence (AI), cyber security, cloud computing, Internet of Things (IoT), big data and analytics, and Virtual Worlds in Australia, Japan and USA
- Lightcast data based on 265,000 technology worker job advertisements in Australia and the required skills for each role, with data extending from 2021 to 2023
- Data from the Australian Bureau of Statistics, both publicly available and from a customised data request as well as other reports and statistics from Australian government sources.

A detailed methodology assumptions and caveats for the figures produced in this report and the national report are available in the appendix of the national report.

The analysis contained in this report around technology workforce has been calculated using ABS occupation and industry classifications, based on the methodology used in previous editions of Australia's Digital Pulse. This methodology draws upon definitions and nomenclature developed by Centre for Innovative Industries Economic Research (CIIER) lead researcher Ian Dennis FACS, and used in the ACS's 2008 to 2013 statistical compendiums and other CIIER analysis.

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Appendix A: Technology workforce skill impacts from critical technologies in Tasmania

2030 skills for advanced data analytics

One of biggest areas of additional skill requirements will come from Advanced data analytics. Annual business investment in Australia in these areas is forecast to jump from $8 billion in 2022 to $15 billion by 2030. Business use of these technologies will grow from less than 5% in 2022 to more than half by 2030 nationally.

What skills will tech workers need for this enormous change?

The essential technical skills needed for advanced data analytics workers include: Data analysis, Data techniques, Scripting languages, Big data, Databases and programming, and Data warehousing. Workers will also need soft skills such as planning, research, problem-solving, effective communication, collaboration, and teamwork.

How many extra professionals and how much more skilling will be needed in Tasmania?

The number of Tasmanian tech workers with skills in advanced data analytics is expected to grow from 300 in 2022 to 700 by 2030.

The total skill requirement to support just the core tech workforce in Tasmania is projected to grow 179% from 886 in 2022 to 2,472 in 2030. The gap between skills now and in the future is a sizable 1,585 technical and soft skills.

Skills sets demanded for cyber security by 2030

- **Cyber security** 187+
- **Network configuration** 136+
- **Cloud solutions** 122+
- **General networking** 126+
- **Information security** 103+
- **Software development principles** 122+
- **System design & implementation** 108+

470 Skilled workers needed (2030)

1,600 Skills gap (2030)

+179 Growth in skilled workers (2022–2030)

People skills

Communication skills	164+
Teamwork/collaboration	136+
Problem Solving	122+
Planning	80+
Stakeholder management	75+

Extra skills identified

- Linear Algebra and Calculus
- Machine Learning
- Critical thinking

Source: Deloitte Access Economics analysis based on Lightcast (2023) & IDC (2023)

2030 skills for enabling cloud technology

One of the largest and most fundamental skilling needs over the coming years is in enabling cloud technology. Annual business investment in Australia in these areas is forecast to jump from almost $21 billion in 2022 to $41 billion by 2030. Business use of these technologies will grow from 59% in 2022 to 84% by 2030 across Australia.

What skills will tech workers need for this enormous change?

Enabling cloud technology will require a broad set essential technical skills include: Cloud solutions, Software development principles, System design and implementation, Operating systems, Network configuration and Databases and programming. Workers will also need soft skills such as planning, research, problem-solving, effective communication, troubleshooting, and teamwork.

How many extra professionals and how much more skilling will be needed in Tasmania?

The number of Tasmanian tech workers with skills in cloud technology is expected to grow from an already sizable 279 in 2022 to 853 by 2030.

The total skill requirement to support just the core tech workforce in Tasmania is projected to grow 206% from 1,067 in 2022 to 3,267 in 2030. The gap between skills now and in the future is a substantial 2,200 technical and soft skills.

To date, the relationship between business investment in and adoption of cloud has generated significant jobs and skill needs. We note that this relationship could shift considerably by 2030, with businesses able to achieve similar outcomes with fewer cloud specialists. If there is a big change, that will mean these projections overstate the jobs and skill needs.

Skills sets demanded for cloud technology by 2030

- **Network configuration** 115+
- **Operating systems** 126+
- **Technical support** 138+
- **Cloud solutions** 540+
- **System design & implementation** 167+
- **Databases & programming** 115+
- **Software development principles** 172+

570 **Skilled workers needed** (2030)

2,200 **Skills gap** (2030)

+206% **Growth in skilled workers** (2022-2030)

People skills

Communication skills	207+
Teamwork/collaboration	161+
Problem Solving	138+
Troubleshooting	121+
Planning	86+

Extra skills identified

- Cost optimisation
- Data management
- Service selection
- Collaboration and communication

Source: Deloitte Access Economics analysis based on Lightcast (2023) & IDC (2023)

2030 skills for Internet of Things

Virtual worlds technology including augmented and virtual reality will experience continued growth over the coming years. Annual business investment in Australia in these areas is forecast to jump from about $267 million in 2022 to $1 billion by 2030. Business use of these technologies will grow from less than 1% in 2022 to almost one-quarter of businesses in Australia by 2030.

What skills will tech workers need for this enormous change?

Essential technical skills for virtual worlds include: Drafting and engineers design, Graphic and visual design software, Animation and game design, Software development principles and Social media. Workers will also need soft skills such as planning, research, problem-solving, effective communication, collaboration, and teamwork.

How many extra professionals and how much more skilling will be needed in Tasmania?

The number of Tasmanian tech workers with skills in virtual worlds is expected to grow from just 2 in 2022 to 18 by 2030.

The total skill requirement to support just the core tech workforce in Tasmania is projected to grow from 9 in 2022 to 68 in 2030. The gap between skills now and in the future is a total of 59 technical and soft skills.

Skills sets demanded for Internet of Things by 2030

- **Internet of Things** 7+
- **General networking** 2+
- **Technical support** 5+
- **Scripting languages** 2+
- **Cloud solutions** 3+
- **Software development principles** 7+
- **System design & implementation** 12+

15 **Skilled workers needed** (2030)

59 **Skills gap** (2030)

+639% **Growth in skilled workers** (2022–2030)

People skills

Communication skills	5+
Teamwork/collaboration	5+
Problem Solving	3+
Project management	3+
Planning	2+

Extra skills identified

- Hardware
- Networking
- Remote Sensing
- Security

Source: Deloitte Access Economics analysis based on Lightcast (2023) & IDC (2023)

Appendix B: Tasmania traditional technology workforce

Technology employment forecasts by occupation grouping, Tasmania (2022 to 2030)

Occupation group	2022	2030	Average annual growth
ICT Management and Operations	3,843	4,708	2.6%
ICT Technical and Professional	3,501	5,318	5.4%
ICT Sales	58	58	0.0%
ICT Trades	1,545	1,603	0.5%
Electronic trades and professional	71	68	-0.7%
ICT Industry Admin and Logistics Support	1,997	1,986	-0.1%
Total ICT workers	**11,017**	**13,741**	**2.8%**

Government funded VET subject enrolment in IT field of education in Tasmania, 2016-2022

Qualification	2016	2017	2018	2019	2020	2021	2022
Diploma or above	84	162	519	337	983	113	75
Certificate IV	222	187	197	199	134	149	149
Certificate III	229	204	221	199	154	184	245
Certificate II	208	177	131	35	58	66	81
Certificate I	382	455	425	366	267	256	0

Technology employment by industry, Tasmania (2022)

Industry	Employment
Agriculture, Forestry and Fishing	277
Mining	36
Manufacturing	92
Electricity, Gas, Water and Waste Services	332
Construction	184
Wholesale Trade	160
Retail Trade	312
Accommodation and Food Services	29
Transport, Postal and Warehousing	261
Rest of Information Media and Telecommunications	33
Financial and Insurance Services	218
Rental, Hiring and Real Estate Services	32
Rest of Professional, Scientific and Technical Services	1,360
Administrative and Support Services	113
Public Administration and Safety	1,038
Education and Training	431
Health Care and Social Assistance	629
Arts and Recreation Services	198
Other Services	176
Telecommunications Services	1,421
Internet Service Providers, Web Search Portals and Data Processing Services	103
Computer System Design and Related Services	3,582
Total ICT workers	**11,017**

Domestic enrolments and completions in IT degrees in Tasmania, 2001 to 2021

	Course enrolments		Course completion	
	Undergraduate	Postgraduate	Undergraduate	Postgraduate
2001	869	55	127	13
2002	1,035	57	186	16
2003	1,007	80	210	22
2004	830	75	199	20
2005	673	69	138	15
2006	552	85	126	11
2007	465	86	111	27
2008	371	67	87	28
2009	362	75	62	13
2010	391	70	58	21
2011	360	79	62	13
2012	365	77	73	16
2013	329	66	55	18
2014	325	45	47	11
2015	328	39	50	11
2016	313	36	45	8
2017	326	31	60	11
2018	317	30	57	9
2019	345	40	48	4
2020	324	27	54	9
2021	418	34	69	4

International enrolments and completions in IT degrees in Tasmania, 2001 to 2021

	Course enrolments		Course completion	
	Undergraduate	Postgraduate	Undergraduate	Postgraduate
2001	115	33	25	14
2002	132	44	34	22
2003	521	50	36	18
2004	1,261	57	45	27
2005	1,467	59	76	18
2006	1,343	98	445	46
2007	1,252	112	387	63
2008	1,119	139	151	78
2009	1,146	142	120	65
2010	1,148	117	115	49
2011	1,162	98	133	53
2012	1,123	123	148	44
2013	967	121	136	41
2014	870	118	276	38
2015	801	170	142	31
2016	677	201	188	55
2017	710	375	186	82
2018	776	740	186	150
2019	810	1,179	212	267
2020	867	1,092	194	490
2021	817	765	234	383

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