Building genuine trust

A framework and strategy for Indigenous STEM and cyber pathways

Dr Huon Curtis, with Dion Devow, Khwezi Nkwanyana, Matthew Page, Megara Thompson.

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Executive summary

Indigenous recruitment and retention in the Australian Defence organisation is defined by a high target of 5% participation in the armed services and 3% in the Australian Public Service component of the Defence Department by 2025. The participation target is a point of pride and a source of clear goodwill and has provided momentum in several areas of Defence for Indigenous employment and pathways.

However, the individual areas of success and effort are yet to translate into an effective whole-of-Defence framework with cohesive lines of effort. This policy report suggests how that can change. It provides a framework and strategy for Defence to support science, technology, engineering and mathematics (STEM) recruitment and retention and cybersecurity careers, particularly through engagement with the vocational education and training system and through targeted relationship building with university- and school-based Indigenous STEM initiatives.

We propose that Defence should enact a wider set of supporting measures—particularly in data and reporting to track professional development—that's more likely to create more sustainable success that delivers organisational improvements and outcomes for Defence. That should include mechanisms to enhance the achievements of the Indigenous Procurement Policy.

Defence must ensure that it meets its immediate skills shortfalls as well as its long-term obligations under the Closing the Gap initiative and the Defence Reconciliation Action Plan to foster genuine and meaningful relationships built upon trust with Indigenous peoples.

We suggest how that's possible through a framework and 56 recommendations focusing on 12 areas of activity:

- data, reporting and user-experience web design
- career pathways
- defence and technology contractors
- community engagement
- procurement and business development
- veterans' employment and procurement
- the vocational education sector
- universities
- recruitment
- retention
- coordination with other public agencies
- international partnerships.

Action on those recommendations will ensure that Defence is an employer of choice and fosters genuine and meaningful trust with Australia's Indigenous peoples. And it will also build Defence's capability to keep our nation safe and secure in a more dangerous world.

Introduction: Building trust—what's visible and what are the blind spots?

The recruitment and retention of Indigenous Australians in the Defence organisation is defined by high ambitions. The aim is to reach 5% Indigenous participation in the armed services and 3% in the Australian Public Service (APS) by 2025. However, the implementation of employment pathways is lagging due to weak engagement with the talent pool, especially with Indigenous Australians who are training in science, technology, engineering and mathematics (STEM) fields in the vocational education and training (VET) and university sectors. Weak talent market mapping means that current success rates in Defence recruiting are unlikely to be maintained, particularly as competition to attract and retain Indigenous workers increases.

A common story in the services and Defence APS is the slow progress on the policy reform that's urgently needed to build Indigenous employment pathways into Defence and through to the wider defence ecosystem, including veterans' employment. Defence needs to demonstrate that it invests in the long-term training, retention and advance of Indigenous personnel.

Our discussions with Defence personnel have revealed that silos in the Defence organisation work against Indigenous recruitment and retention. The services are driving much reform, but a comprehensive data picture and an annual public report that canvasses what's working well—that establishes clear process metrics, benchmarks and areas for attention, including in recruitment, retention, training and professional development—means that many work areas are without a clear guide or a definition of success beyond participation targets, so their efforts are unfocused and can be discordant.

Developing measures and public reporting, including on how senior leadership is achieving Indigenous targets within the workforce, will be an important step forward. It will cement Defence's leadership role as an exemplar to other parts of government and the wider defence industry. It will also ensure that Indigenous employment is addressed as part of the renewed drive to optimise defence data, as outlined in the Defence Data Strategy 2021–2023.[1]

Setting up Indigenous employees for success within the One Defence team requires Defence personnel at all levels to have greater situational awareness of the grassroots reasons for Indigenous Australians joining, staying in, or leaving the organisation. Developing career pathways requires policy and procedures geared towards addressing the drivers and impediments to jobs and training in cities, regions and remote Australia for Indigenous men and women of different ages.

Addressing career pathways and enhancing retention require a mindset that anticipates employee issues—including cultural factors—and addresses them so that Indigenous Australians decide to join and stay. The cultural integrity framework for the APS, sponsored by Defence, will be an important part of that effort. The framework seeks to provide support for employees and leaders so that Indigenous personnel are invested in as a resource in Defence and in the Australian Government's broader strategic thinking and so that their experience and insight are valued appropriately.

The 'pathway' metaphor is often deployed to describe Indigenous training and employment programs and equity and social inclusion initiatives.[2] Pathways are rarely straight lines. Indigenous employment pathways aren't just about entry points, but are also about systemic training and development opportunities within Defence and beyond into veterans' employment. Defence will need to approach attraction broadly to reach school leavers and students in the VET and university sectors. Defence and other agencies will need to ensure that the growth of Indigenous opportunities is part of the government's revised 'industry cluster' model for skills development.[3]

One bright spot is the Indigenous businesses sector, which is a growing source of employment, labour market information and training for young Indigenous people. Defence is a driver in that sector. In 2020–21, Defence outstripped its target of 676 contracts, awarding 6,476 contracts worth $610 million to Indigenous businesses.[4] Although that was a doubling of contract value, from $300 million to $600 million in one year, a House of Representatives committee report tabled in August 2021 suggested various measures to increase the capability of the Indigenous business sector in order to push the sector further up the value chain. Since 2015, Defence has awarded $1.86 billion in contract value to more than 550 Indigenous businesses.

Problems in the Indigenous business sector, such as 'blackcladding' (creating a management structure that satisfies the ownership criteria for the Indigenous Procurement Policy but in which control of the enterprise can be vested in non-Indigenous managers), are not adequately addressed by current policy. Indigenous business operators have said that they feel discriminated against in procurement panel processes and that they have higher barriers to overcome. Although that view is also characteristic of many non-Indigenous small and medium-sized enterprises (SMEs), it risks undermining Defence's current achievements.

The size of Defence's procurement portfolio creates an expectation that it should take a leading role in procurement policy reform. Improved opportunities that reinforce the expansion and maturation of sovereign industrial capability through Indigenous businesses would be a step forward, given that Indigenous businesses have substantially better employment outcomes for Indigenous people than non-Indigenous businesses.[5] However, that will be a real challenge, as the sector needs to mature in its training and finances to deliver to Defence. A veterans' business procurement policy could strengthen relationships with Indigenous veterans.

Initiatives for Defence and other parts of government that tie together training, scholarships and pre-apprenticeship programs would provide a major lift to current efforts. Initiatives to build capability (business incubators, venture financing and ensuring that existing policy tools are being used effectively and opportunities for veterans' businesses) would increase the ability of Indigenous businesses to deliver higher value contracts. There are risks in all those areas, so Defence's activities will need to be communicated clearly to stakeholders and political decision-makers, and the linkage of those policies to Defence's core purposes—delivering capabilities for the government to use to advance Australia's security—must be clear.

This is a clear point of difference between the broader defence industry and the Defence organisation. Defence's ambitions include a market-leading participation target, using procurement as a driver of an economic and social uplift, and a commitment to meet Closing the Gap targets. Defence can

encourage industry to take up the challenge, given its stake in key areas such as cybersecurity. In the broader business environment, there's patchy engagement with reconciliation processes (particularly the registration of reconciliation action plans with Reconciliation Australia) among major defence contractors, including those that provide recruitment advertising or provide technology. This is an area where Defence can influence overall change in the sector.

There will always be tension for Defence and government between targeting problems that are clearly visible (and for which data is available) and addressing blind spots. Labour market data on Indigenous Australia is notoriously unreliable, so government action can be misaligned. For example, an effort to improve the quality of labour force statistics by the Department of the Prime Minister and Cabinet's Central Analytics Hub was shelved because of the Covid-19 pandemic, the bushfire season and data access problems. Defence can be a powerful advocate for improved federal and state data collection as a basis for policy and implementation in this area.

Visible data creates a bias towards taking action that seems relatively straightforward, but which in fact will require concerted efforts on multiple fronts and involve several government portfolios or work areas. For example, the Certificate IV in Cybersecurity qualification in the vocational sector is only four years old. The curriculum was developed by TAFE administrators and several technology and cybersecurity companies and overseen by the Victorian Registration and Qualification Authority, but with no Defence involvement.

A seemingly straightforward solution, such as directing recruitment efforts towards TAFE cybersecurity students, can be surprisingly complicated. Current data (from 2020) shows that 129 Indigenous students were studying for the Certificate IV in NSW, 55 in Queensland and 275 in Victoria.[6] Twenty-four registered training organisations across the country are currently approved to deliver the course.[7] However, the National Centre for Vocational Education Research public data isn't disaggregated to the campus level, so exactly where those students are learning (including online) is difficult.

This is why relationship building comes up so often in discussions with those in Defence charged with attracting Indigenous candidates and with their counterparts in the education sector responsible for guiding students into careers. Relationships trump everything when data is ambiguous, and raw numbers (on, for example, completion rates) might not tell the full story of Indigenous perseverance. For example, Indigenous students are much more likely than non-Indigenous students to experience conflict between study and family commitments, including caring for children or other family members, which affects results.[8]

Defence hasn't built strong enough relationships through frequent interactions with the VET and university sectors, including Indigenous Elders in universities and Indigenous pro-vice chancellors (some of whom are ADF veterans). Its signature cyber initiatives—the ADF Cyber Gap and Cyber Defence College—don't have a visible Indigenous engagement strategy or a clear link to the Defence TAFE Employment Scheme. TAFE is a major trainer of Indigenous Australians.

Defence has set itself an ambitious goal in the Defence Reconciliation Action Plan 2019–2022: 'fostering genuine relationships built on trust.'[9] Trust is intangible, but high-trust organisations have lower costs and ensure social cohesion in the face of rising uncertainties.[10] How Defence holds itself to account and builds long-term relationships with Indigenous Australians will be a key marker of its future success.

To build trust makes the task of Defence more ambiguous and success more difficult to assess in the short term. Box-ticking exercises will risk jeopardising Defence's ambitions to be an employer of choice. Defence isn't a social policy portfolio, but it does have obligations under wider government policies, particularly the National Agreement on Closing the Gap. The population growth of Indigenous Australia is shifting towards the southern capital cities and the more populous states and territories, which is something to keep in mind when allocating resources because of the potential to exacerbate existing inequalities in access.[11]

The harder task is to forge relationships with communities and address the impacts of Defence's past policies with Indigenous people, as indicated in the Defence Reconciliation Action Plan. Aspects of this work are being done through the engagement activities of the Indigenous Liaison Officer network and through initiatives such as the appointment of Indigenous elders to military bases. But some foundational blocks are missing, such as an Indigenous youth engagement strategy and a digital service design attuned to the way Indigenous candidates access internet services, including for labour market information.[12]

Fostering genuine trust is necessary for Defence to truly represent the nation that it protects. There are opportunities to partner with Indigenous Australians, build capacity alongside them and prioritise their leadership so that the collection and use of data, strategies on staff training and development, and strategies on youth, veteran, business and community engagement are developed in genuine partnership.

1. Defence has doubled its headcount of Indigenous employees but needs to go further

The ADF has led the public and private sectors with its stated workforce target of 5% Indigenous participation by 2025. The APS component of Defence has a more modest target of 3% by that time.[13] In the past seven years, Defence has doubled its headcount of Indigenous employees. Some growth has come from increased numbers of Indigenous reservists and increased self-nomination of Indigenous status. The increased self-nomination is an indication that the ADF is creating a more inclusive culture but also a sign that the next phase of growth will be more difficult and that there's been more limited additional Indigenous recruitment than the headline statistics convey.

The government's announcement in March 2022 that it will increase the military to 80,000 uniformed personnel and the Defence organisation to 101,000, including APS staff, has put recruitment challenges and shortfalls under the spotlight, particularly in an economy in which unemployment is at record lows and pressures on wages are building.[14] Defence needs to double its Indigenous headcount again by 2025 in order to hit the 5% participation target.

Defence personnel have praised the participation target. It's a source of immense pride across the services. It has provided a lot of momentum and some novelty to Indigenous recruitment. There's a sense of 'throwing everything at the wall' to achieve the target.

The 5% target has no doubt contributed to the doubling of Defence's headcount of Indigenous staff in the past seven years, which is to be commended. It's exceedingly rare to see an initiative that pushes beyond parity, or in proportion with population numbers. The growth within the APS is more modest. No other government agency or private-sector organisation has articulated a similar ambition as the ADF.

In 2014, there were 750 Indigenous ADF personnel and 210 in the APS. The totals are now 1,975 in the ADF, 385 in the APS and 826 in the reserves (Figure 1). The ADF has experienced a 137% increase, while in the Defence APS Indigenous employment has grown by 62%.

Figure 1: Headcount growth of Indigenous personnel in the services and APS, 2015 to 2021
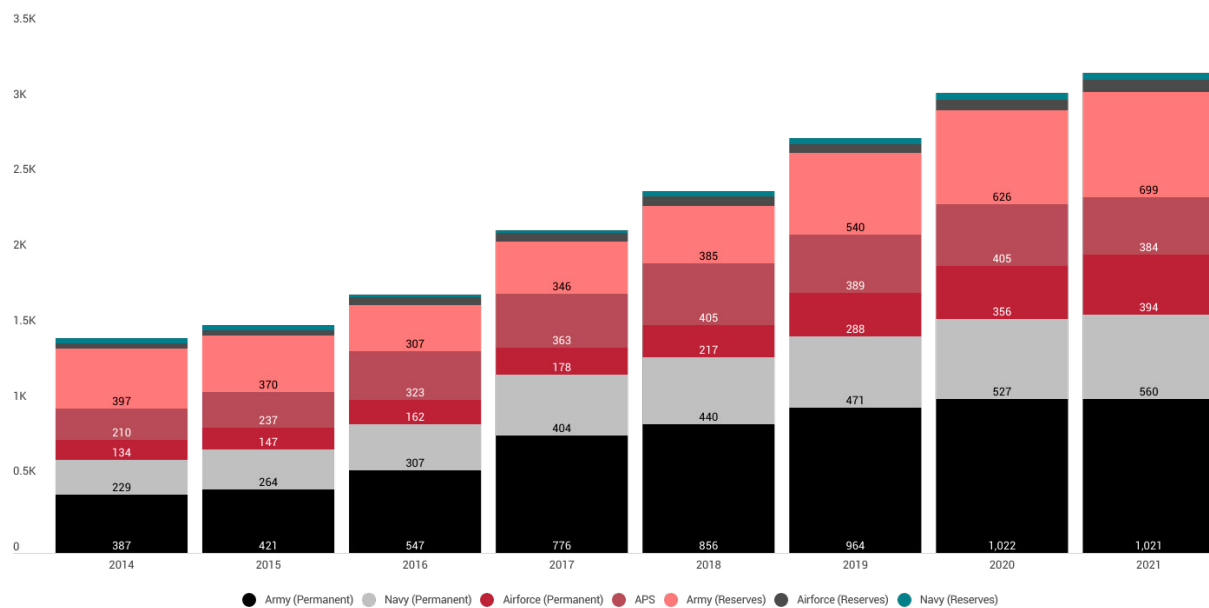
Source: Defence annual reports, 2013 to 2021.

As a proportion of the workforce (Figure 2), 3.7% of permanent ADF members have indicated that they are of Indigenous origin, compared with 2.3% in the 2015 Defence Census. The breakdown by service shows that the Navy (4.3%) had a slightly higher proportion of Indigenous members than the Army (3.9%) and the Air Force (2.8%).

The Navy, Army and Air Force now employ more than the estimated proportion of Indigenous Australians in the working-age population (2.4%), but Defence APS has flatlined since 2018 and the Air Force is behind the APS average (3.4%).

Figure 2: Indigenous Defence personnel as a percentage of the total Indigenous labour force
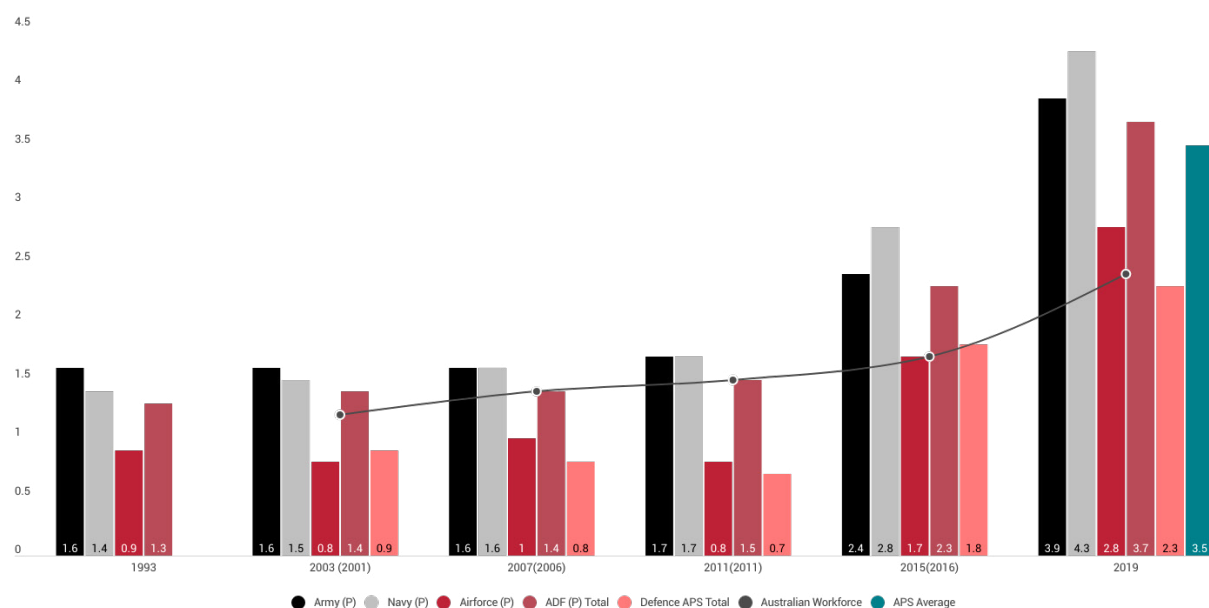
Source: Defence annual reports, 2013 to 2021.

In the wider Defence portfolio, there are some very weak areas of Indigenous employment, such as the Department of Veterans' Affairs, which, at 30 July 2020, employed an APS workforce of 1,746, of whom 1.26% (22 employees) identified as Indigenous,[15] falling short by 1.74% (30 employees) of the Australian Government target of 3%. The department has targets of 5% representation at APS levels 4–6 by 2022, 5% at Executive level (EL 1 and EL 2) by 2024, and 3% at Senior Executive Service (SES) level by 2024.

Although the past two years have seen increased numbers of non-Indigenous Australians looking to join the military, that doesn't appear to have shifted the numbers of Indigenous recruits.[16] Figure 3 shows the average rate of headcount growth across the armed services and the APS. After a few high-growth years from 2014 to 2017, the trend is towards more modest year-on-year growth.

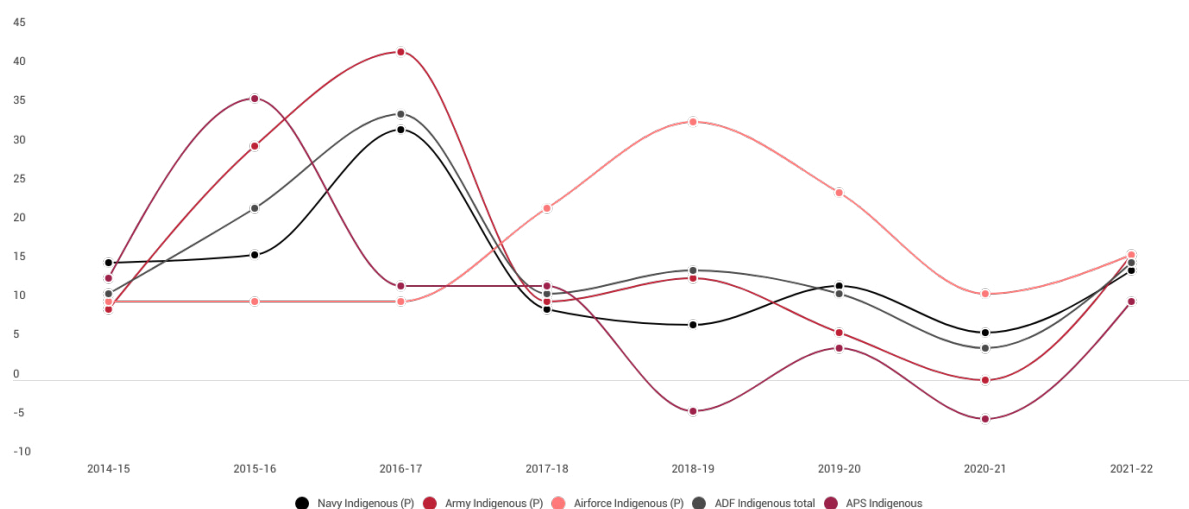Figure 3: Average rate of growth of Indigenous armed services and APS personnel, 2014–15 to 2021–22

Source: Authors' calculation based on Defence annual reports.

Increased self-nomination of Indigenous status may have contributed to the initial headcount growth. The Navy has indicated that part of the reason its Indigenous numbers were at 4.3% in 2019 was that a higher number of Indigenous personnel had self-nominated.[17]

1.1. Defence's current pathways are well designed but risk isolating Indigenous engagement in particular parts of the organisation

The 'pathway' metaphor is often deployed to describe Indigenous training and employment programs and equity and social inclusion initiatives.[18] The ADF and APS have used the pathway design for their current Indigenous development programs, which have multiple entry and exit points (such as work experience and gap years).

The Army and Navy Indigenous development programs (IDPs) and the Air Force Flexible Recruitment pathway are designed with the involvement of Indigenous elders and educators. They aim to build the confidence of Indigenous candidates and immerse them in both military and Indigenous culture.

Discussions with Defence personnel have revealed that the programs have appeal across different age groups and genders. The Navy IDP reports a 68% flowthrough rate to recruitment.[19] The Army IDP didn't increase its numbers between 2019 and 2020 (Figure 4). Airforce Flexible Recruitment grew from 35 participants in 2018–19 to 100 in 2019–20, but dropped in 2020–21 to eight recruits. Defence

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work experience appears to be a strong source of overall growth, but it didn't run in 2020–2021 due to Covid-19 shutdowns.

Figure 4: Defence Indigenous pathways, 2013 to 2021
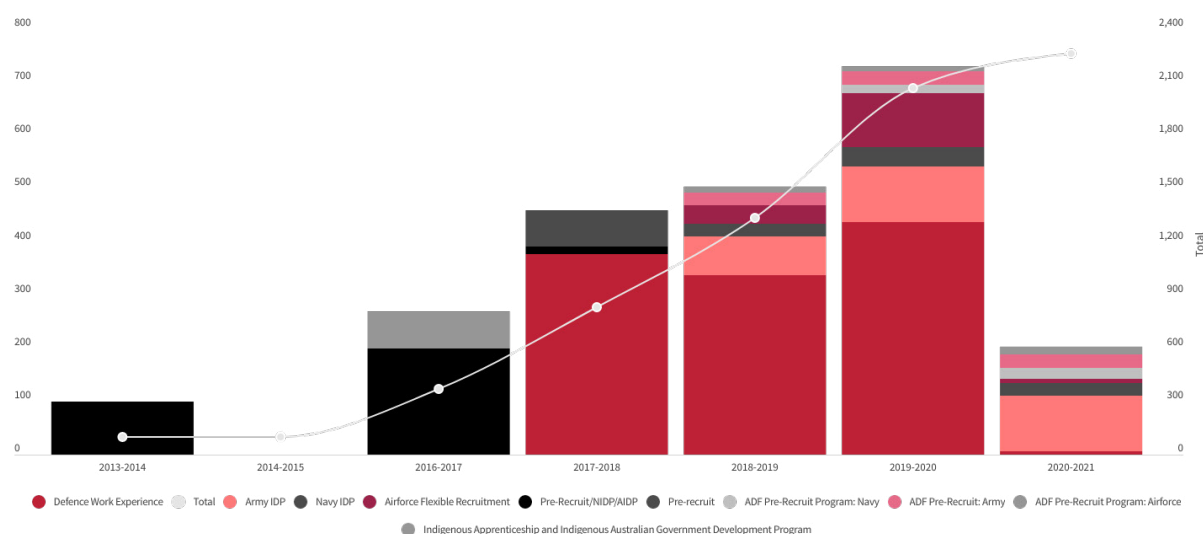
Source: Defence annual reports, 2013 to 2021.

Some reporting on the flowthrough rates from pre-recruit programs would help to grow this area, if they function like pre-apprenticeship programs, in which evidence suggests higher progression rates to higher apprenticeships for Indigenous participants.[20]

The IDPs aren't well known or advertised, even in the regions where they're held, such as the Cairns region.[21] Coordination with the National Indigenous Australians Agency, which sponsors various First Nations media organisations, could ensure a more strategic advertising spend in Indigenous media, such as the National Indigenous Radio Service.

The current IDPs are directed mainly at school leavers, although some older candidates have also undertaken the courses. The pathways are geared towards ensuring that candidates reach milestones such as Year 10 maths, science and English.

Defence work experience appears to provide a solid cohort of Indigenous recruits. In order to increase participation by Indigenous Australians engaged in vocational education, a clearer link could be drawn to the Defence TAFE Employment Scheme as a possible pathway for Indigenous candidates.[22]

1.2. It's unclear whether Indigenous personnel are staying once employed and whether Defence is providing them with development opportunities

Systems engineering has long been a means of managing complexity in the defence environment: the assumption is that better data drives better strategic decision-making. However, a number of data gaps prevent Defence knowing whether it's providing opportunities for Indigenous personnel once they're recruited.

Attracting people to careers in defence is important, but retaining personnel is the key to maintaining capability. Indigenous APS members in Defence aren't making it far past the graduate level and are

under-represented at senior levels. Defence's annual reports don't provide a guide to the levels of seniority of Indigenous personnel in the services.

Across the APS, Indigenous employees are more likely to be recruited to and remain at junior levels. Of all Indigenous employee engagements, 79.4% are at trainee to APS 4 levels, compared to 50.7% for non-Indigenous employees.[23]

Figure 5 shows the classification levels of Indigenous and non-Indigenous staff in the largest APS agencies (the Australian Taxation Office, Defence, Home Affairs and Services Australia). This is the maximum level of disaggregation possible in the public APS employment database. Indigenous staff are over-represented at the APS 1–4, trainee and graduate levels, and under-represented at the senior APS, EL and SES levels.

Figure 5: Classification levels of Indigenous and non-Indigenous staff in the largest APS agencies (Australian Taxation Office, Defence, Home Affairs, Services Australia), 2021 (%)
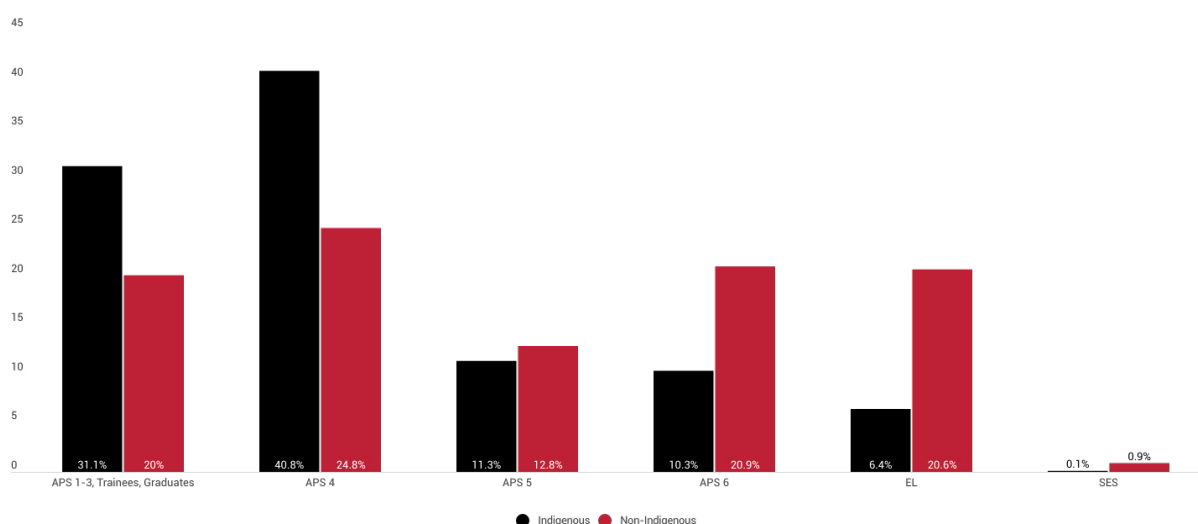
Source: APS Employment Database interactive interface (APSEDii), online.

Throughout the APS, there's a high separation rate for Indigenous employees. The 2020 *State of the service report* states that Indigenous employees stay in the APS for a median of 3.9 years compared to 12.0 years for non-Indigenous employees.[24] In a workshop with ASPI, Indigenous representatives from the armed services reported that all the services experience dropouts within 12–18 months of recruitment. Recruits usually complete the military training but drop out of career progression training.

Limited availability of employee data from the three armed services makes it difficult to draw conclusions about overall attrition rates, although discussions with senior Indigenous officers reveal both gaps in data about why Indigenous personnel leave and high separation rates.[25] Training programs that assist in providing a pathway from APS 4 to APS 5, APS 6 and EL positions need to be advanced.

What's clear from Australian Bureau of Statistics (ABS) Census data is that men and women in Defence, regardless of their Indigenous status, follow very distinct paths. Figure 6 is constructed with ABS Census data and shows the fields of study of those with qualifications in Defence in 2016. Figure 7 shows the overall percentages of qualifications in Defence, by fields of study, using ABS Census data.

Figure 6: Profile of Indigenous and non-Indigenous Defence personnel, by field of study, 2016

Legend:
- Engineering and Related Technologies
- Management and Commerce
- Society and Culture
- Information Technology
- Natural and Physical Sciences
- Health
- Education
- Architecture and Building
- Food, Hospitality and Personal Services
- Creative Arts
- Agriculture, Environmental and Related Studies
- Mixed Field Programmes
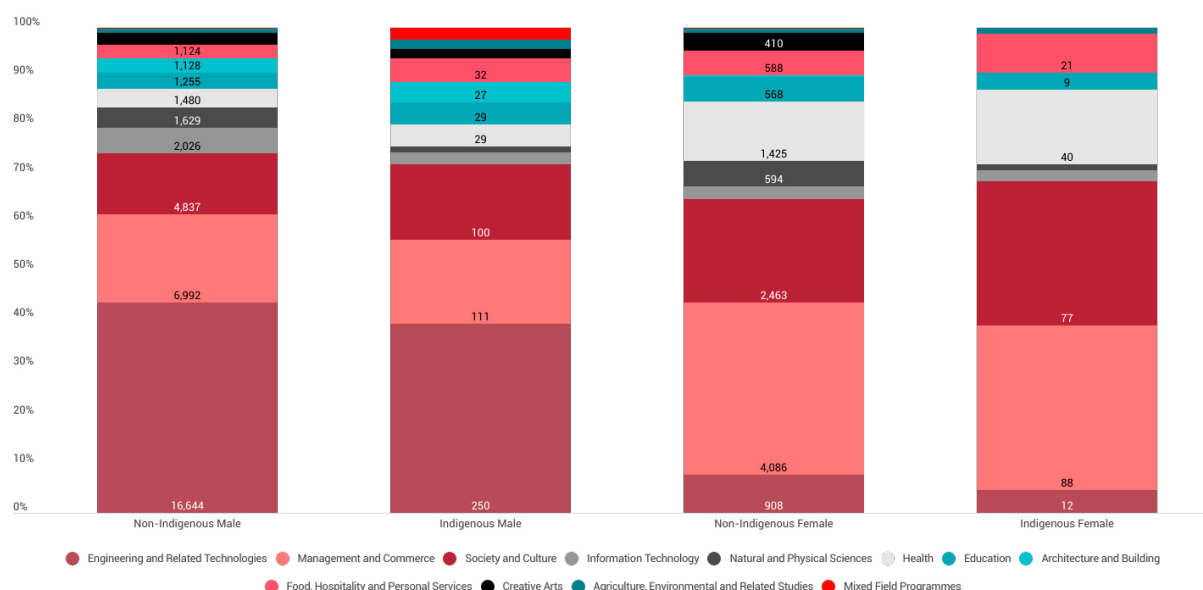
Source: ABS Census, 2016.

Figure 7: Percentage of qualifications in Defence, by field of study, 2016

Food, Hospitality and Personal Services 3.60%
Architecture and Building 2.46%
Education 3.80%
Health 6.07%
Natural and Physical Sciences 4.56%
Information Technology 4.83%
Society and Culture 15.27%
Management and Commerce 23.03%
Engineering and Related Technologies 36.38%
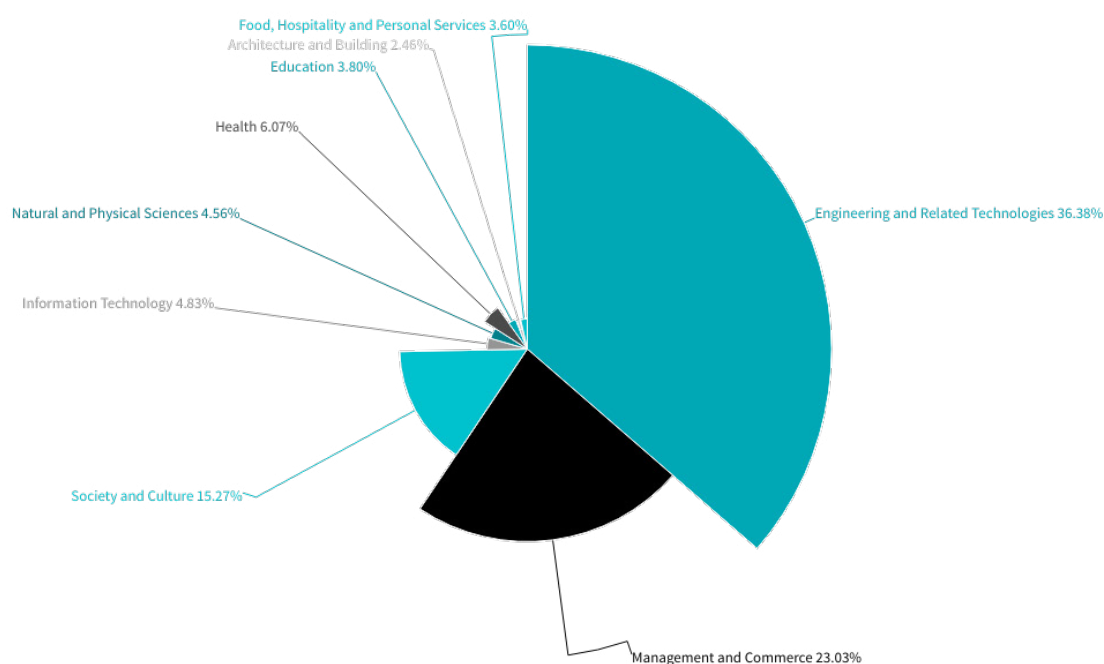
Source: ABS Census, 2016.

Forty-three percent of non-Indigenous men and 38% of Indigenous men in Defence had engineering qualifications. Among women, 7.8% of non-Indigenous women and 4.6% of Indigenous women had engineering backgrounds.

Although the numbers of non-Indigenous men and women with qualifications in health were similar (1,480 non-Indigenous men, 1,435 non-Indigenous women), overall, as a percentage of the total non-Indigenous male and female workforce, 12.35% of women and 3.85% of men had backgrounds in health. Among Indigenous women, 15.44% of those employed in Defence had health backgrounds, while 4.52% of Indigenous men had health backgrounds.

Although the data in figures 6 and 7 is now five years out of date, the implication is that men and women have been entering Defence through highly distinct pathways. Men typically have engineering qualifications, while women have qualifications in management, commerce, health, social science or cultural studies.

It's clear from Figure 8 that Defence has historically had a higher proportion of Indigenous personnel with high school and certificate level qualifications, compared to non-Indigenous employees. Among men in Defence, 26.4% of non-Indigenous men had Certificate III or IV qualifications, while 32.7% of Indigenous men had such qualifications. The situation is more stark for Indigenous women: while 17.8% of non-Indigenous women had Certificate III or IV qualifications, 30.6% of Indigenous women had those qualifications.

Figure 8: Highest level of educational attainment, Indigenous and non-Indigenous men and women in Defence, 2016
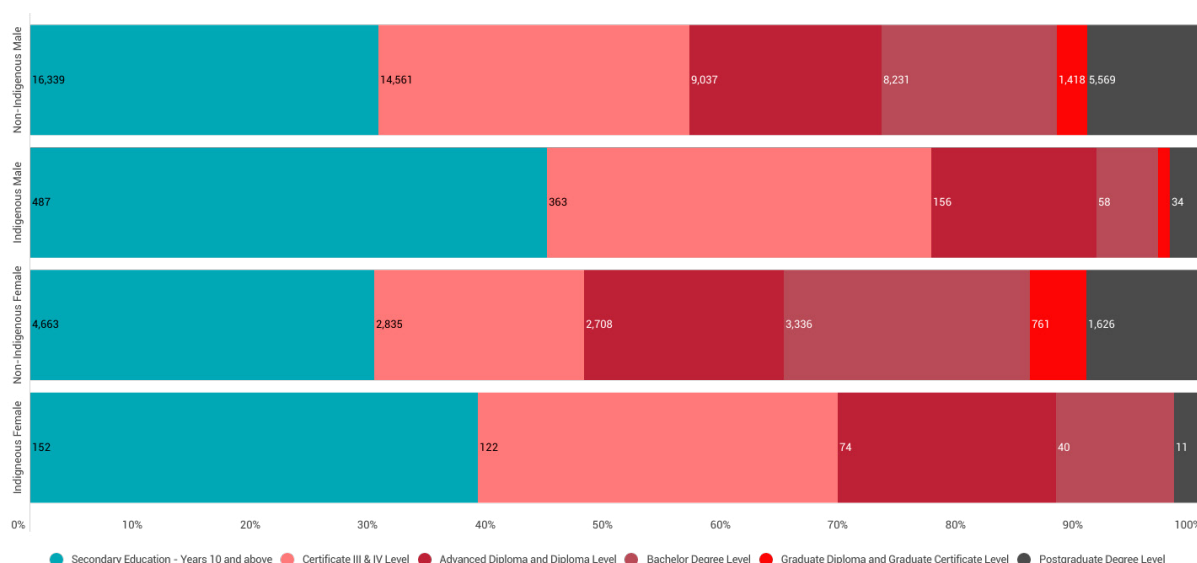
Source: ABS Census, 2016.

The low percentage of Indigenous personnel with bachelor or postgraduate qualifications is perhaps an indication that existing mechanisms to train while in service aren't reaching Indigenous candidates.

A challenge is to shift the proportion and number of Indigenous engineers and IT experts across the organisation, but also to ensure training and development opportunities so that Indigenous personnel reach rates of bachelor and postgraduate degrees roughly equivalent to non-Indigenous employees.

The question is whether the doubling of the Indigenous headcount in the past six years has shifted that profile. The next Census, to be released mid-2022, might reveal slight changes in the Indigenous cohort within Defence, but a change in the academic profile is unlikely, given that the under-representation of Indigenous students in IT and engineering in the university sector is longstanding.

While it's necessary to focus effort on recruiting Indigenous employees from the stream of graduates coming out of the wider education system, stopping there will achieve only limited success because of the limitations of the existing pipeline. Defence has to think and act more broadly and focus particularly on retention and current training.[26]

1.3. Understanding why Indigenous Australians join and leave the APS and the services is needed to drive further growth

Understanding the reasons people join and leave Defence will enhance recruitment efforts. More research is needed to provide a firm basis for ongoing recruitment actions. This section synthesises the limited work done on why Indigenous people join the APS and outlines the results of a workshop undertaken at ASPI with Indigenous Defence personnel. There are clear gaps in understanding attraction and retention.

Research in 2016 by the Centre for Aboriginal Economic Policy Research (CAEPR) sought to understand the push and pull factors for Indigenous people to join and leave the APS (Table 1).[27] While that research is a couple of years old, it highlights the strong motivators of Indigenous public servants—particularly their drive to improve government policy and serve the community.

Motivations to join	• Help improve government policy and programs • Serve their community • Contribute to activity on Indigenous issues • A useful initial step into the working world

Reasons to leave	• 'Unmet expectations' (i.e. the APS was oversold)
	  – Disappointment at not being able to make a difference (e.g. by improving the wellbeing of communities)
	  – Effectiveness of APS in dealing with Indigenous issues
	  – Relationships with community stakeholders
	• Politics and policy
	  – Not able to deliver meaningful programs to Indigenous people
	  – Poorly designed policy that damages personal relationships with communities
	• Career and supervision
	  – Lack of opportunity to use or develop skill set
	  – Difficult or exploitative supervisors
	  – Lack of support from leadership teams
	• Racism
	  – Bullying and harassment
	  – Complaints process (e.g. 'Generally better not to respond' to avoid negative reactions from others)
	• Being undervalued
	  – Queries concerning the substantive intent of Indigenous recruitment and diversity targets (i.e. beyond simply numbers)

Reasons to stay	• Secure employment with a good salary and flexible conditions • Supportive colleagues • Strong connection to working on Indigenous issues • Ongoing community engagement

Source: Adapted from: N Biddle, J Lahn, Understanding Aboriginal and Torres Strait Islander employee decisions to exit the Australian Public Service, working paper no. 110/2016, Centre for Aboriginal Economic Policy Research, Australian National University, 10 June 2016, online.

ASPI ran a workshop with Indigenous Defence personnel to assist in identifying issues in recruitment and retention. While the motivations of Indigenous APS and services personnel may differ, some common themes came through in the workshop. They are synthesised in Table 2. The issues outlined in the table have been used to drive research for this report.

Table 2: What are the issues facing Indigenous personnel in recruitment and retention?

Attract	• Build long-term relationships with communities through centring Indigenous Australians in employment, recruitment and training initiatives (e.g. role modelling, 'You can't be what you can't see', recruitment of elders) • Make pride in Indigenous culture a core business of Defence • Protect Country: build linkages to serving community needs • Build networks with existing STEM programs at TAFE colleges and universities (e.g. Defence Force Recruiting, Indigenous liaison officers, Special Recruit Team Indigenous) • Ensure that psychological/psychometric testing accounts for cultural difference and that assessors are culturally trained
Retain	• Cultural training needs to be consistent and embedded, not just around key dates (e.g. NAIDOC Week) • Indigenous liaison officers and Special Recruit Team Indigenous need exposure to digital initiatives and digital literacy training, leadership and finance training • Indigenous personnel need mentoring, resourcing and support • Lack of data on why Indigenous recruits leave, how they progress in the services, and the training provided • Need to better understand attrition of Indigenous service personnel. A reason for leaving can be a difference in expectation about their role or the location of their service • Ensure recruit to area – the strategy promoting choice or stability of location in recruitment – and work experience are better understood as pathways to recruitment • Digital service design needs to be attuned to access issues of Indigenous candidates and personnel. For example, Veterans Affairs' needs to ensure that Indigenous personnel, particularly those living on Country, are accessing benefits (e.g. funeral benefits) • Understanding why recruits leave is hindered by lack of cultural knowledge and education. Indigenous candidates may provide one type of response to a non-Indigenous recruiter, compared with an Indigenous recruiter • Recruits usually complete military training but career progression training is where the people drop out

Source: Workshop conducted with ASPI.

Senior Indigenous personnel revealed that developing the skill set of Indigenous personnel once they're employed is an issue—particularly the Indigenous Liaison Officer network and the Special Recruit Team Indigenous. Recruits usually complete military training but often drop out of career progression training.

Equipping Indigenous employees with digital skills (alongside other training, such as in finance and leadership) may be an effective way to develop their engagement activities. Knowledge of the way that Defence is using digital technologies (gaming platforms, drones and so on) may assist Indigenous liaison officers in their engagement with potential future recruits and the wider community.

Mentoring programs were identified as an issue, and peer-mentoring is an area that could be developed further.

2. Defence needs to develop its Indigenous data strategy and other digital and engagement initiatives

The Indigenous participation target gives some clarity and drive to the Defence mission. However, because 'what gets measured is what gets done', the target can also fail to help Defence act in ways that improve the quality of Indigenous employment and careers in Defence. A wider set of supporting measures is more likely to create more sustainable success that delivers organisational improvements and outcomes for Defence beyond the participation target, as well as providing satisfying and high-achieving careers for its Indigenous employees within the One Defence team.

The Defence Data Strategy 2021–23, launched in August 2021, outlines areas of improvement for digitised data, including corporate, human resources, industry and economic data relevant to the Australian defence industry.[28] The effort to improve the Department of Defence's data environment should also ensure that data on Indigenous personnel is developed, alongside the ethical use of (Indigenous) data policy and digital literacy.[29]

Defence personnel have praised the participation target highly. It's a source of immense pride across the armed services. It has been a lofty ambition that has provided a lot of momentum and some novelty to Indigenous recruitment. There's a sense of 'throwing everything at the wall' to achieve increased participation.

Commitment to the outcome of the Indigenous participation target should go hand in hand with appropriate process metrics that establish clear benchmarks and areas of attention.[30] A range of qualitative metrics would help to identify areas that are doing well so that other areas can learn from those achievements. There's a public blind spot about what happens to Indigenous Australians once they're recruited. It's difficult to assess whether and how Defence is providing training opportunities, professional education, internal mobility and promotions.

It's difficult for Defence to gain knowledge of what's working and what isn't in developing and retaining its Indigenous workers so that it can invest in success and address points of failure. The lack of reporting on robust internal development opportunities is a barrier to long-term growth. Defence needs mechanisms to feed insights from the experiences of Indigenous personnel back into strategic decision-making.

If only some areas of Defence are pulling their weight, that negates the intent and purpose of the Defence Reconciliation Action Plan 2019–2022, which is to make Indigenous cultural intelligence part of Defence's core business.[31] There will be some areas of Defence that overperform. Transparency will shine a light on the areas that are doing well and provide a clearer line of sight for targeted recruitment into emerging areas.

The Defence Indigenous Employment Strategy 2012–17 moved Defence's focus from predominantly engaging with remote communities to also building relationships with regional and urban communities. It's unclear from annual reports, whether, and how, that pivot has affected recruiting.

No publicly available figures show the net flow of Indigenous personnel, satisfaction rates with recruitment, internal mobility and training opportunities within Defence.

An annual public report might assist in establishing clearer benchmarks and give more heft to the 5% participation target. It makes little sense to expend vast amounts of manpower on recruitment if the churn rate is high and professional development opportunities are neglected.

Defence now produces the *Women in the ADF report* as a supplement to the Defence annual report, and it is a potential model for reporting on Indigenous matters in defence. Given the higher numbers of Indigenous women now graduating from university, a more concerted strategy for attracting women might offer opportunities to consolidate Defence's recruitment.

The *Women in the ADF report* tracks progress across strategic initiatives and measures women's participation in all stages of the employment cycle.[32] The report identifies successes as well as areas where continued focus is required, including in the occupational areas in which women remain under-represented: combat and security; and engineering, technical and construction groups.

The report also provides estimated percentage increases required by the services to meet 2023 participation targets and the distribution of women and men by rank.

The proportion of women in the ADF has increased steadily since the inaugural *Women in the ADF report* in 2013–14. In 2019–20, women made up 19.2% of the ADF workforce—an increase of 3.9% from 2015. That compares well with other militaries. In 2018, Australia was ranked third among all NATO and partner nations.

The *Women in the ADF report* has clear guidance on what success looks like beyond a participation target. It lists measurable key performance indicators on women's attrition rates and satisfaction with recruitment processes.

The report also provides guidance that connects women's participation with Defence's emerging international goals (such as the Australian National Action Plan on Women, Peace and Security 2012–2018). Part of that includes increasing the capacity to deploy women on exercises, operations and humanitarian and disaster response missions and appointments to key engagement roles.[33]

Given the linkages between Australian Indigenous communities and those in the near region, including in Vanuatu, Solomon Islands, Fiji and New Zealand, it makes good strategic sense to strengthen avenues via Indigenous appointments to similar engagement roles.[34] The Department of Foreign Affairs has issued an Indigenous Diplomacy Agenda to increase Australia's influence in the international system.[35]

2.1. … including on how leadership is delivering

Just as the qualities of leadership go beyond organisational structure (leadership is everyone's responsibility, regardless of rank), there will be opportunities to engage with Indigenous affairs in every portfolio (reconciliation within Defence is everyone's business).[36] However, how senior leadership is engaged will be of paramount importance.[37]

Early reports on attempting to change the approach towards women in the ADF are instructive. Writing in 1996, Clare Burton made the point that leadership was the crucial issue if change was to come:[38]

> Discrimination issues are leadership issues first and foremost. If unequivocal commitment and support from leaders is the critical leverage point, that is the key area where change in practices and behaviours must take place.

> Education on its own will not achieve this change. Strong accountability measures will make a significant contribution to it.

> The perception of managers, supervisors and Service members of the level of leaders' commitment to successful gender integration has a profound effect on workplace practice and behaviour.

There are now two Defence Indigenous champions representing the APS (Deputy Secretary Estate and Security Celia Perkins) and the services (Chief of Air Force Air Marshal Mel Hupfeld AO, DSC), who advocate for Indigenous participation within Defence and drive cultural awareness within Defence-specific and whole-of-government initiatives. While the Defence website outlines some responsibilities of the champions,[39] a clearer account of how success is measured would help to communicate the vital importance of those roles.

One responsibility of the champions is to promote Indigenous procurement opportunities in Defence through the Australian Government's Indigenous Procurement Policy, but it's unclear how that's measured. Is it through the number of business forums attended, or increases in the number of Indigenous businesses accessing Defence advisory services? Working with the Digital Transformation Agency and using its stages of the service design and delivery process might help to align users' needs with the delivery of better procurement outcomes, while also building the capability of Indigenous businesses.

The Defence Reconciliation Action Plan provides a set of deliverables and accountabilities across portfolios, but some form of public document that measures success against benchmarks might provide further guidance. It would also provide further avenues for engagement with key Indigenous stakeholders.

Enhancing the documentation of key measures, timelines and successes (for example, through a public dashboard or report) might help to provide a more compelling picture of Defence's work. We note that the web page on Indigenous APS pathways appears to not have been updated in seven years.[40]

2.2. There are opportunities to engage with internal and external stakeholders on an Indigenous data strategy

Australian Indigenous peoples are considered to be the most researched peoples in the world.[41] National guidance documents on research with or about Indigenous Australians have tried to ensure meaningful engagement and reciprocity between researchers and the individuals and communities that are the subject of research.[42] Hence, the collection of more or different data is both a risk (if not done appropriately) and an opportunity to engage with Indigenous civil society experts. Australian Indigenous data experts have called for localisation and control over Indigenous data as an extension of political sovereignty. Navigating between the need for more or better data and community

expectations of research processes is an inevitable part of building and maintaining relationships across the community, and is reflected in the Defence Reconciliation Action Plan.

Leading Indigenous academic Professor Marcia Langton has said that data sovereignty concerns the ability and capacity of Indigenous people to locally manage their data 'with respect to ownership, access, consent, collection, analysis and reporting'.[43]

At a symposium at the University of Melbourne in partnership with the Australian Institute of Aboriginal and Torres Strait Islander Studies, Langton stated that addressing the complex issues of disadvantage for Indigenous Australians:

> … requires the existence of data that is relevant and of high quality … However, the lack of reliable and consistent disaggregated data for Indigenous Australians is striking, resulting in the paucity of evidence-based Indigenous policy-making.

The Indigenous Data Network, led by Langton, is working with the Coalition of Aboriginal and Torres Strait Islander Community-controlled Peaks (the Coalition of Peaks) to develop the new platform, which will enable Indigenous organisations to upload and analyse their own data.

Ensuring that adequate consultation is undertaken will be an important step in a strategy for Indigenous data management.[44] The Defence Reconciliation Action Plan has a potential model in its deliverable 60, which is to work with Reconciliation Australia to undertake, where possible, actions that are mapped to the United Nations Declaration on the Rights of Indigenous People.

This may help to address clear absences in other parts of Defence's purview:

- There was an absence of data on suicides of Indigenous service members in the landmark investigation of defence and veterans' suicides.[45]
- Senior Indigenous officers in the services report gaps in data reporting on why Indigenous personnel leave the services.[46]

The Defence Reconciliation Action Plan requires Defence to respect cultural protocols of Aboriginal and Torres Strait Islander people. There's an opportunity to include cultural protocols in the development and use of data resources of both staff and Defence's Indigenous stakeholders. The department launched an Indigenous learning portal within the Defence Online Academy in 2020–21, providing ongoing nationwide access to a range of online courses and key documents.

There are opportunities for the International Policy Division of Defence to connect with near allies, such as New Zealand, on advancing a strategy for Indigenous data management, alongside engagement with Australian Indigenous academic and civil society.

2.3. Digital service design should help tell a compelling story of Defence's achievements and reform plans and guide Indigenous users to pathway programs

The Department of Defence Indigenous Pathways web pages need an overhaul and redesign in order to more clearly communicate the prerequisite skills and cohorts at which each Indigenous program is directed. It's imperative that web pages have up-to-date information and a user experience design that takes Indigenous users to pathway programs. The Digital Transformation Agency provides guidance

on the service design and delivery process to support agencies to meet the Digital Service Standard criteria. Ensuring that Indigenous Australians are served in digital service design is paramount to improving access and equity.

Many links on the Indigenous Pathways pages are broken, or take users to programs owned or managed by other departments. The Defence Jobs website is a point of contrast where prerequisite skills are clearly communicated ('Join with year 10 passes'), but could make clearer links with vocational qualifications (such as 'Join with a TAFE qualification', or 'Work towards TAFE skills').[47]

There are numerous department pages that don't appear to have been updated since 2015 (for example, the Indigenous APS page has an announcement of a program from 2015 that Defence will employ an additional 135 Indigenous Australians under the Affirmative Measures Program, but no other announcements of measures since then).[48] Other programs advertise confusing or inscrutable information (for example, the difference between APS-2 and EL-2 classifications may be familiar to those working in Canberra, but it's unclear to the uninitiated). There appears to be some duplication of program areas and some orphan programs (initiatives that ran once or twice and still maintain a web presence). Table 3 is a non-exhaustive review of problems with Department of Defence web pages.

Table 3: Department of Defence Indigenous web page issues

Pathway	Focus	Cohort	Issues
Indigenous Pre-Recruit Program	Physical fitness Character development Cultural appreciation	School leavers	No click-through link
Navy Indigenous Development Program and Army Indigenous Development Program	Language, literacy and numeracy Military skills Physical fitness Vocational education and training Cultural appreciation Leadership and character development	School leavers	Unclear what level of vocational education is provided
Indigenous APS pathways	Unclear	APS 2 to EL 2	Website not updated since 2015 No compelling Defence story Too much assumed knowledge of APS classifications
Defence Indigenous University Support Program	Unclear	University students	Link to criteria, eligibility, application has 404 error message
Indigenous Graduate Pathway	Unclear	University graduates	Could be clearer that university graduates are target
Airforce Flexible Recruitment	n.a.	n.a.	Has no webpage
ADF Cadets	n.a.	n.a.	Click-through to general cadets page that has no Indigenous-specific information
Traineeships	n.a.	n.a.	Link takes user to Australian Public Service Commission website then Services Australia website

Indigenous Apprenticeship Program	n.a.	n.a.	Link takes user to Services Australia website
Indigenous Australian Government Development Program	n.a.	n.a.	Unclear link to Defence: 'contribute to a career where you will make a difference in Defence' … Link takes user to DESE website

n.a. = not applicable.
Source: Department of Defence, 'Indigenous pathways', 2022, online.

The departmental website devoted to details of the Reconciliation Action Plan could convey a more compelling story of Defence's journey, progress to date and ambitions for the future.[49]

In consultations with currently serving personnel and veterans, other problems were identified in the design of government digital services—including those of Defence—and their delivery to Indigenous users:

- Indigenous ex-service members in NORFORCE aren't accessing their full paid entitlements
- There are questions about whether Defence has built websites so that access is possible in low-data regions (such as northern Australia), where sharing phones is common.

There's no doubt that in recent years there's been a sea change in the digital delivery of government services. However, ensuring that the benefits of the digital era are delivered to broad Indigenous public benefit remains an issue.

The last national data on Indigenous internet access is from 2014–15 and showed that 73.5% of Indigenous Australians aged 15 years or over accessed the internet in their homes. In late 2021, the National Indigenous Australians Agency released a discussion paper that identified an increasing access gap for Indigenous Australians: at least 10 percentage points fewer Indigenous families than non-Indigenous families access the internet at home. Indigenous families are more likely to have prepaid internet and phone plans, meaning that low-data options for websites are optimal to increase engagement.[50]

At the state level, there have been instances in which service design has reportedly increased Indigenous engagement with government service provision.

For example, the New South Wales Office of the Children's Guardian worked with a design agency to identify key service initiatives to encourage and enable more Indigenous applicants to obtain a working-with-children check, delivering better outcomes for themselves and their families.[51]

The approach was a co-design process to fully understand the experience of Indigenous Australians with the goal of narrowing the inequality that perpetuates ongoing cultural, social, economic and geographical displacement of Indigenous Australian adults and children.

The work was integrated by the Office of the Children's Guardian across its service, increasing Indigenous people's access to work and services and the proportion of Indigenous children being cared for within their communities.

Defence needs to ensure that its digital service design, workforce data measures and management, leadership accountability, and the digital literacy of its workforce are working hand in hand to tell a compelling story of Defence's achievements, goals, works in progress and directions, as well as to guide Indigenous users to web portals that clearly convey opportunities to join the One Defence team.

2.4. Defence needs to consider developing a 'strength-based' or 'resilience-based' framework or assessment tool in recruitment alongside a 'human in the loop'

Each of the services consulted for this report has taken issue with Defence Force Recruiting and Manpower. There's a perception from the services that Indigenous recruitment is a lower priority. Whether or not that's the case, it's a perception that needs to be addressed. Ensuring effective recruitment requires a culturally intelligent 'human in the loop' (that is, a recruiter with robust cultural training) to ensure that Indigenous candidates are fairly assessed.

Current recruitment approaches rely on the application of a universal aptitude test. All candidates, regardless of background, take the aptitude test, although it's reportedly screening out too many candidates, forcing a changed approach.

The Navy and Army ensure that Indigenous candidates speak to a recruitment officer regardless of the results of the aptitude test, but the Air Force does not.

Defence has already adapted its recruitment assessment to more fairly assess the physical differences between men and women. The development of a culturally informed 'strength-based' or 'resilience-based' recruitment framework would allow fairer assessments of Indigenous candidates.

In discussions, senior Indigenous officers noted that they had observed instances in which a candidate's leadership ability was assessed and downgraded because the candidate 'stood apart from a group' and 'appeared shy'. They explained that they frequently step in to explain to recruiters how candidates satisfy criteria but are being judged unfairly on cultural grounds.

The CSIRO uses a strengths-based approach in its Indigenous science initiatives.[52] Research involving young Indigenous men found that what contributed to resilience was:

> … being authors of their own solutions, having agency to carry out those solutions; not being problematized or labelled negatively; given respect as a group and having safety; civic connectedness, belonging and having a responsive community; and having hope for a future which is about flourishing not just surviving.[53]

Similarly, among young Indigenous women, growth in confidence, resilience and self-concept was connected with the strong cultural component of a school-based pilot study in Dubbo.[54] Many of the examples of Indigenous resilience are derived from health contexts and have a strong emphasis on Indigenous-led research and engagement.[55]

Indigenous officers also stated that psychological or psychometric testing needed a cultural framing. Western Australian of the Year, Dr Tracy Westerman, has developed a number of Indigenous psychological tests that account for cultural difference and are culturally appropriate. How Indigenous candidates are examined and assessed by recruitment teams and the skill set of psychologists employed by Defence in recruitment are also areas worth attention.

The need for Indigenous involvement in recruitment methods will become more important as recruitment becomes potentially more quantified and reliant on data, analytics and algorithms. Modern recruitment approaches—including in the US Air Force—are attempting to recruit for 'attributes' rather than performance, using analytics and algorithms to assist recruitment and selection.

The US Air Force Special Operations Command has started to take advantage of the large amount of data on operators that has been collected over the past 30 years. Lieutenant General James Slife told the National Defense Industrial Association's vSOFIC 2020 industry conference:

> It's not really as much about how quickly you can do a ruck march with a 30-pound ruck and how many pull-ups and push-ups you can do. It's really more about the attributes that you possess … We've got a lot of data that we can go back and mine, and find out what makes for the most successful special operators.[56]

The use of artificial intelligence systems in hiring can lead to perverse outcomes and legal risks. The Google search engine was less likely to show ads of highly paid jobs to women compared to men.[57] Amazon's machine learning 'taught itself' that male candidates were preferable, penalising résumés that included the word 'women', and downgraded graduates of two all-women's colleges.[58]

Defence should review its recruitment assessment processes to identify bias against Indigenous candidates and develop recruitment processes to fairly assess those candidates. It's important to ensure that barriers to participation are addressed as part of the renewed drive to optimise defence data, as outlined in the Defence Data Strategy 2021–23.

2.5. Defence needs stronger linkages to Indigenous elders and effective resourcing of Indigenous liaison networks to link in with local high school, vocational and university STEM initiatives

The appointment of Indigenous elders to military bases around the country will contribute to changing community perceptions about military work. Research on Indigenous school students indicates that elders are a major influence on the decision to finish school and proceed to further training.[59] The influence of family on career decisions can be seen in the Air Force marketing campaign 'See yourself in the Air Force'. Multiple studies have shown that elder and family support are important enablers for participation and retention.[60]

Figure 9: An Air Force recruitment video

Source: Defence Jobs Australia, 'See yourself in the Air Force: Coomara and Grace', *YouTube*, 2022, online.

Uncle David Boye spoke with ASPI after hearing about that research from Lieutenant Colonel Tom Biederman at Lavarack Barracks. Appointed in September 2021, Uncle Dave is the first ever Indigenous elder appointed to 3rd Brigade and works alongside Australian Army cultural adviser Aunty Lee Smallwood to embed Indigenous cultural knowledge at Lavarack Barracks.

It was clear from consultations that Defence could develop stronger linkages with local education providers, including James Cook University's ATSIMS program, the CSIRO at James Cook University, the Queensland Virtual STEM academy at Thuringowa High School in Townsville, and the Townsville TAFE college, which will launch a Certificate IV in Cybersecurity course this year.[61]

Defence Recruitment focuses on university engagement on careers days. There's a lack of broader and routine engagement, particularly with university elders as key points of contact.

In Townsville, a number of STEM and cyber initiatives have requested increased interactions with Defence:

- The Townsville Cybersecurity Innovation Node is tasked with assessing the cybersecurity landscape in the region holistically to support government collaboration with industry and academia in order to create educational pathways and local businesses in cybersecurity.

- NQ Spark is set to be the preferred ADF simulation training centre and is currently accepting investment from the private sector for construction. Notably, NQ Spark will use local talent to develop high-tech solutions as well as to leverage relationships with universities, government and private industry, including the Queensland Defence Science Alliance, to bolster Townsville's participation in defence innovation.

- The Australian Institute of Marine Science has placed Indigenous knowledge and expertise at the forefront of its work through Aboriginal and Torres Strait Islander partnerships. Recognising the natural synergy between the knowledge of traditional owners and the institute's research, the institute has conducted numerous projects to marry the two and better address ecological damage to the Great Barrier Reef.

- In the maritime sector, Austal is supporting the Guardian-class patrol boats of the Pacific island nations in Cairns, and TAFE Queensland is training their crews. Cairns has also been selected for the RAN's first regional maintenance centre, and an industry partner is expected to be in place by early 2022.

More broadly, Defence needs to conduct an audit of local STEM initiatives in its areas of operations and routinise interactions with them through appointing elders to bases or through further resourcing of the Indigenous Liaison Network.

The work of Indigenous liaison officers across the services isn't easily classifiable. Their work is a mixture of community and school engagement. In general, they know just about everyone in the local community and are on hand to navigate what are often complex intercommunity politics and animosity towards authorities. One Army Indigenous Liaison Officer told ASPI that in some areas of the north of the country, the Army helped navigate interactions between police and the community. An Air Force Indigenous Liaison Officer in Katherine goes to funerals, establishing long-term relationships with communities.

Resourcing Indigenous Defence personnel with digital skills (alongside other training, such as in finance and leadership) might help in developing and retaining existing personnel. Knowledge of the way that Defence is using digital technologies (such as gaming platforms and drones) could assist Indigenous liaison officers in their engagement with potential future recruits and the wider community. It's also important to note that successful engagement with Indigenous cohorts in STEM disciplines focuses on immersive, participatory projects that address community challenges.

2.6. Building the cyber capacity of Indigenous communities is an opportunity for further developing the Army Aboriginal Community Assistance Program

Cyber and digital systems are increasingly important to Indigenous economic development, including land management (for example, storing data related to monitoring invasive species). Since 1997, the Army Aboriginal Community Assistance Program (AACAP) has worked with Indigenous communities across Australia to develop physical and human infrastructure. It delivers some training and builds community infrastructure such as community centres, roads, sewerage treatment plants and health clinics.

A 2017 review of the AACAP found that it was a good example of Australian Government agencies working collaboratively to improve primary and environmental health and living conditions for Indigenous Australians, while providing valuable training outcomes for the Army.[62] In doing so, the program reinforces the strong association between the Army and Indigenous Australians.

The review also found that there was an absence of targeted ADF recruitment messaging delivered in conjunction with AACAP projects, although that's reportedly changed in the years since then.[63] Indigenous community members considered that there would be benefits in the Army engaging with youth and working-age people on military career opportunities.

The review made a number of recommendations, the main ones being as follows:
- Infrastructure designs should align with community and/or end-user capacity and capability.
- Training programs should be linked with community development programs for jobseekers.

- Community-specific training and employment plans for each project should be introduced.
- Regional force surveillance units and the Army Reserve should be consulted in the early stages of community identification.
- Services should be sustained in communities after projects are completed.
- The focus of investments should be on locally identified priority areas (including training and capability development, education, employment, and safety).

It appears from public reporting on the community assistance program that more tailored infrastructure and skills programs have been delivered. This has included teaming up with a registered training organisation, Training Connections Australia, to deliver nationally accredited courses in construction and hospitality in 2016 in Laura, Queensland. The Army also 'worked with the Indigenous capacity-building organisation, Many Rivers, to provide business and administration training specifically tailored to the needs of the local Aboriginal corporation, Ang-Gnarra'.[64] In 2017, the training program included providing training for the Certificate II in Hospitality and Catering; workshops on soapmaking and basic computer skills; courses in maths and painting; construction pathways; partial qualifications in business administration; and Aboriginal and Torres Strait Islander health (Table 4).[65] It's unclear whether the link to formal training and qualification has continued.

Table 4: AACAP community infrastructure and training projects, 2010 to 2019

Year	Community	Physical infrastructure	Training
2010	Pukatja	water pipeline, road maintenance	n.a.
2011	Joy Springs Community	Residential housing, water source, sewerage	n.a.
2012	Fitzroy Crossing	Childcare centre, 1 house, stormwater drains	Small engine repair
2013	Kaltjiti	Children and family centre, 4 homes, water supply	Small engine repair, basic construction, home repairs
2014	Wutunugurra	Sealed road, workshop and community centre	Basic fabrication and welding, website development
2015	Titjikala	Waste management facility, 2 houses, football change room	Welding, cooking
2016	Laura	Wastewater system, basketball court	Nationally accredited courses in construction and hospitality, business administration
2017	Toomelah	Community centre, stormwater drainage, resealed roads	Hospitality, catering, soapmaking, basic computer skills, business administration, maths, health
2018	Yalata	Improvements to airfield, art gallery and café.	Maintenance and hospitality
2019	Jigalong Community	All-weather creek crossing, public amenities block, BBQ area, youth and family area	Construction, tourism

Source: Peter Kikkert, P Whitney Lackenbauer, 'Using civil–military operations to expand and deepen relationships with northern communities, with examples from Alaska and Australia', *Canadian Military Journal*, Autumn 2021, online

There remain significant barriers to access both to technology and to reliable and affordable internet and mobile phone coverage in many communities. Cyber literacy is under-recognised as central to many Indigenous community challenges (such as financial literacy) and priorities (such as the extension of sovereignty into the online domain). Technology infrastructure, access and affordability hasn't been addressed in many communities in regional and remote areas.[66]

However, it's important to note that issues involving access to technology will be different in each community. Researchers and representatives of the Pitjantjatjara community write of the development of the Indigenous archive project, Ara Irititja, which began as a concept in the late 1980s. In 1994, with a hand-me-down Macintosh computer, Ara Irititja began to construct its archive.[67]

There are intercultural challenges in defining the terms of cyber engagement with Indigenous communities. In general, core concepts of cyber are understood differently among communities. Researchers into cybersafety in remote communities found that the term 'cybersafety' isn't necessarily recognised. Instead, the local word for 'protection of community' is favoured.[68] 'Protection' suggests a more proactive set of behaviours, including a social obligation to watch out not only for oneself but for the entire social and family group.

As indicated in the 2017 review, increasing engagement with NORFORCE, the Far North Queensland Regiment (51FNQR) and the Pilbara Regiment on community assistance programs and throughout the engagement may lead to recruitment outcomes. NORFORCE is the largest employer of Indigenous people in both the Northern Territory and the Kimberley region.[69] The units use the latest military technology, including GPS equipment, night fighting equipment and communication equipment and technologies. Hence, integrating them into AACAP activities makes a firm connection between technologies, protecting Country and job pathways.

Figure 10: Locations of the Army Aboriginal Community Assistance Program

Source: Holly Godwin, 2019 'Army Aboriginal Community Assistance Program (AACAP) 2018—Yalata, South Australia', *The Cove*, 2019, online.

3. Defence's new capability requirements haven't meant the robust development of the Indigenous talent pool

It's well known that Defence must grow and reshape its workforce to meet new capability requirements, particularly in areas such as intelligence, cybertechnology, engineering and other specialist skills.[70] The Australian Government's announcement in March 2022 that it will increase the military to 80,000 uniformed personnel and a total of 101,000 people, including APS members, has put recruitment challenges and shortfalls under the spotlight, particularly in an economy in which unemployment is at record lows and pressures on wages are building.[71] The national skills system is transitioning over 2022 to a new 'industry cluster' model, which is designed to improve the speed to market of qualifications and ensure that training product development is aligned to skills development and meets industry's needs, thereby delivering more learners into jobs.[72]

Indigenous participation needs to be an important part of the renewed recruitment effort, along with a commitment to growing participation in areas of strategic priority.

The 2009 Defence White Paper was the kickstarter for the ADF to focus on cyber growth in order to strengthen defence capabilities. It also included requirements to recruit more people from culturally and linguistically diverse backgrounds.[73] The 2016 Defence White Paper stated that the 'government will strengthen Defence's cyber capabilities to protect itself and other critical Australian government systems from malicious cyber intrusion and disruption.'[74]

Ensuring that existing industry growth clusters in the states and territories have Indigenous employment and business procurement initiatives is an opportunity to further advance Indigenous affairs under the influence of Defence.

Across the various levels of government, it's important that all areas of Defence planning engage with Indigenous affairs. Queensland is a major centre of growth for defence recruiting.[75] However, the recently launched Queensland Defence, Maritime, Aerospace and Space Industry Skills Plan and the Defence Industry Roadmap don't mention Indigenous business or Indigenous skill development.[76] The Northern Territory Defence and National Security Strategy mentions a number of ways in which defence is collaborating with the territory's education and skills initiatives to enhance employment and procurement opportunities. The Western Australian Defence Strategy mentions that Southern Metropolitan TAFE will develop a Defence Workforce Development Plan and establish a dedicated Defence office to help meet the education and skilling requirements of the state. This is another opportunity to ensure that Indigenous participation is addressed.

The recruitment and retention of Indigenous candidates with intelligence, cybertechnology, engineering and other specialist skills is limited, particularly in cybersecurity roles that require advanced qualifications. Like most employers, Defence is reliant on the pipeline from schools, universities and the VET system. Low enrolments of Indigenous candidates in IT and engineering in the university sector are a longstanding problem. Before enhanced recruitment can occur, participation and completion rates in the secondary education, VET and tertiary sector must improve. Some comprehensive talent market mapping would help drive targeted recruitment of Indigenous

candidates, but Defence's recruitment efforts will be constrained without other areas of government helping to push completion rates upward. Linking vocational and higher education completions with job opportunities could enhance recruitment efforts in Defence and wider government areas.

This section shows overall numbers of Indigenous students enrolled in and completing courses in the vocational, tertiary and secondary educational sectors.

There are a number of factors that limit the ability to tell a compelling story. The Cybersecurity Certificate IV qualification was inaugurated only in 2018, and the latest vocational data is from 2020. University enrolment and completion data has similar limitations, which prevents us understanding how the Covid-19 pandemic—and particularly the resulting switch to online learning—may have affected Indigenous education patterns. Enrolments in university courses and course completions have been rising steadily, but it appears that overall completions by Indigenous students in the vocational sector are in steady decline. Wider efforts from the Department of Education, Skills and Employment and state and territory jurisdictions are needed to support students to completion.

3.1. Increasing science capital

Educational researchers argue that a range of factors influence the decision to pursue a science-related career, including gender, class, ethnicity, educational factors (such as the way science is structured within schools), the provision of careers advice and the amount of 'science capital' a young person has.[77] 'Science capital' refers to science literacy ('what you know'), attitudes towards science ('how you think'), science-related activities and behaviours ('what you do') and science-related contacts and networks ('who you know'). The implication is that those with high 'science capital' are attracted to science careers and that policy should be articulated to influence the depth and breadth of science capital. This is the framework that the national science and technology educational centre, Questacon, uses in its engagements.

In the Australian Indigenous context, increasing 'science capital' is tied to appraising the role of Indigenous scientific knowledge, reinforcing, for example, the link between Indigenous ecological practices and biodiversity (that is, 'what you know' and 'how you think'). This is the approach undertaken by the CSIRO.[78] Equally, showcasing Indigenous achievement in science by building programs around Indigenous mentors and champions ('who you know') as well as elders (who are key influencers on school completion) is a component of successful Indigenous educational programs, including school-based, vocational and university programs. This is something to keep in mind as Defence and other agencies structure their engagement in the education sector.

3.2. Vocational enrolments

This section focuses particularly on VET enrolments in the Certificate IV in Cybersecurity and the entry-level IT course for the Certificate III in Information, Digital Media and Technology. The numbers are far smaller than in the areas normally looked at in regard to Indigenous employment strategies, such as courses in health and education. However, this slightly wider scope is necessary to ensure that Indigenous participation is considered *ex ante*, not *post hoc*.

The vocational certificate in cybersecurity is only four years old. The TAFE curriculum has been developed in collaboration with ANZ Bank, BAE Systems, Cisco Australia and New Zealand, the

Commonwealth Bank, Deloitte, NBN Co, Telstra and the Australian Information Security Association. Box Hill TAFE in Victoria was the first campus in which the degree was initiated, and rollout is now happening across the country.

There were 35,858 total students enrolled in the Certificate IV in Cybersecurity in 2020. Of those, fewer than 1% were Indigenous (291 men and 56 women), and most of them were concentrated in Victoria and NSW (Figure 11). Figure 12 shows Indigenous males and females enrolled in the course in 2020.

Figure 11: Enrolments in the Certificate IV in Cybersecurity, by state and territory, 2020
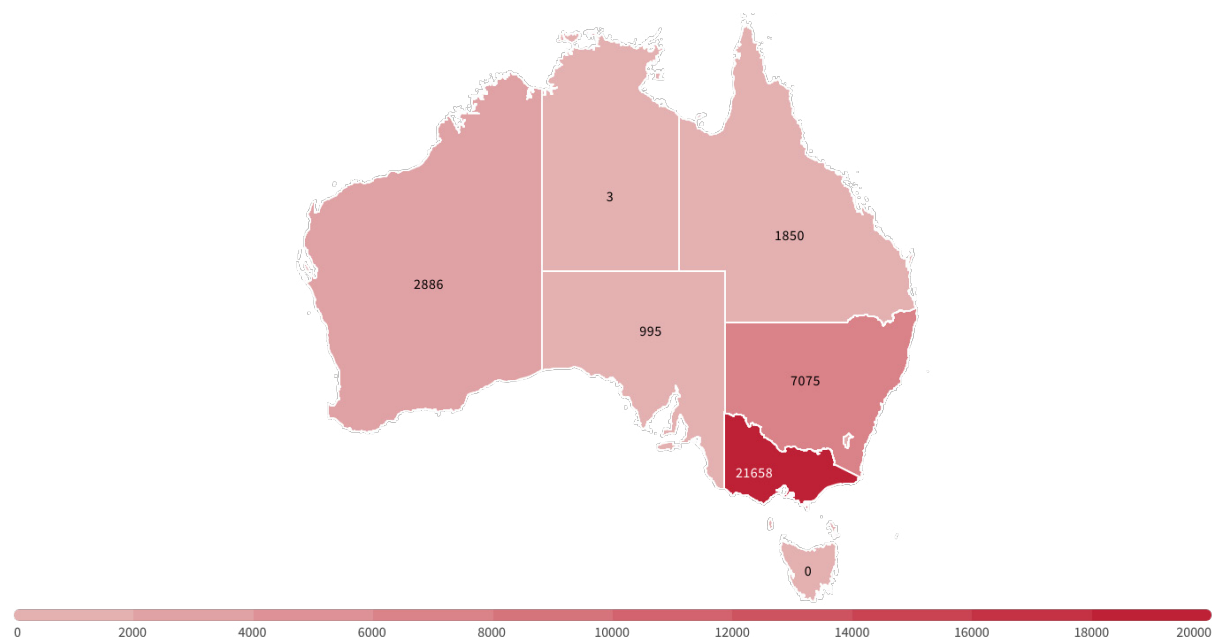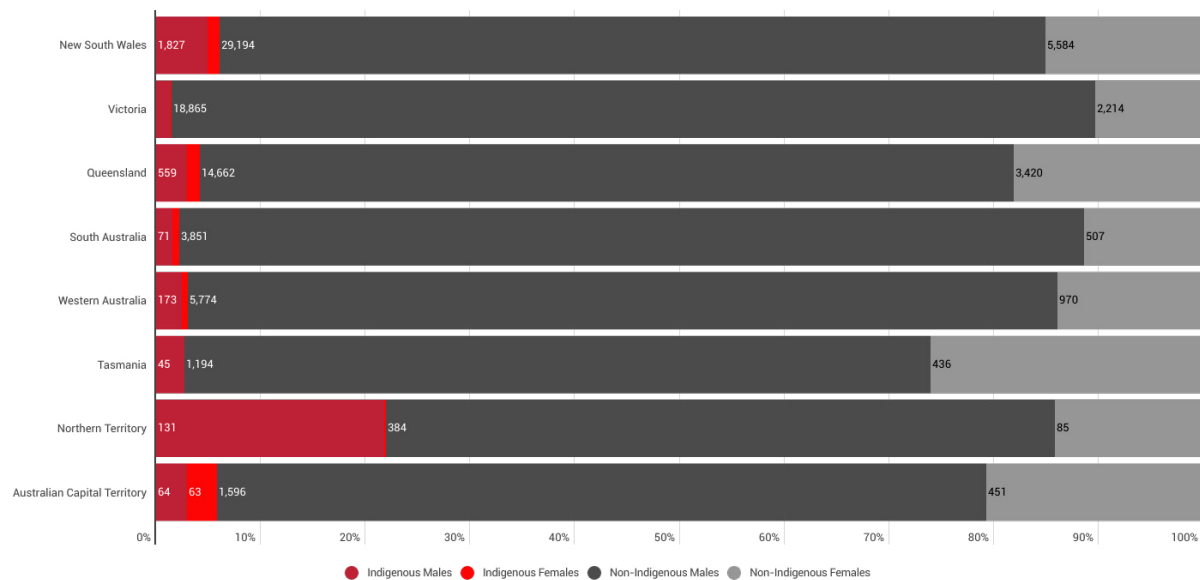

Source: NCVER.

Figure 12: Indigenous males and females enrolled in the Certificate IV in Cybersecurity, 2020
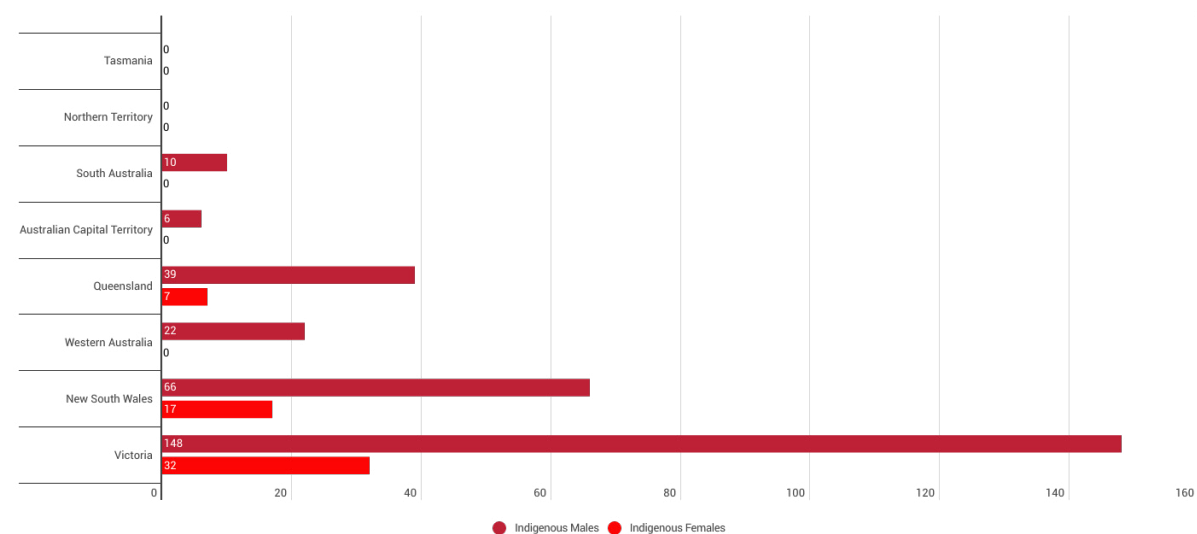
Source: NCVER.

Indigenous students represent about 1% of the total enrolment at the Certificate IV level. However, enrolments of Indigenous students made up 4.4% of the entry-level (Certificate III) cohort over 2019 and 2020. Nationally, Indigenous men made up 4% of total male enrolments and Indigenous women made up 5% of female enrolments in the Certificate III in Information, Digital Media and Technology (Figure 13).

Figure 13: Indigenous and non-Indigenous males and females enrolled in Certificate III in Information, Digital Media and Technology
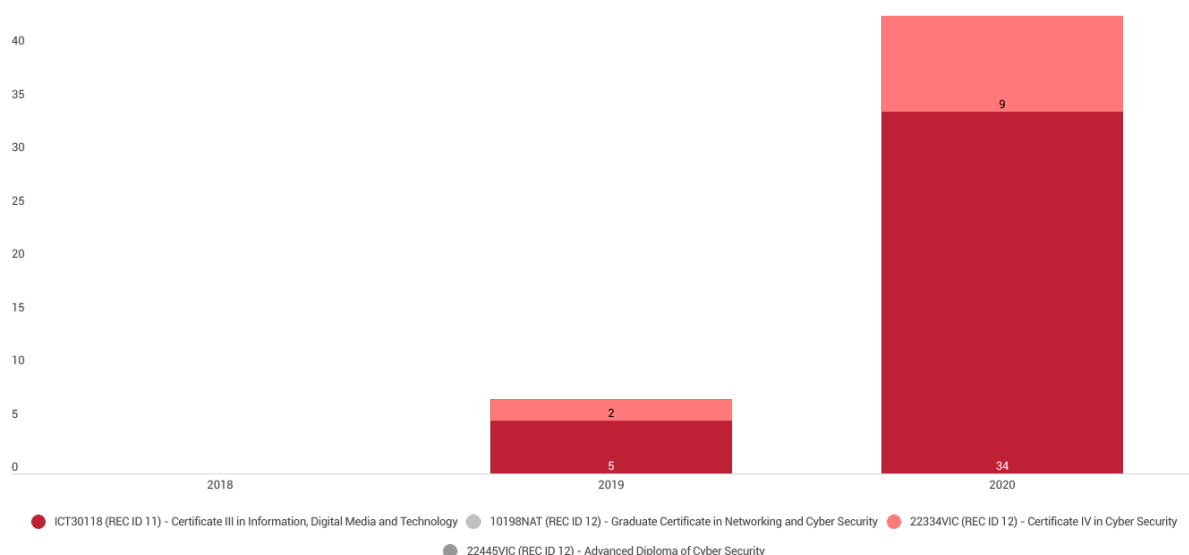

Source: NCVER.

The newness of dedicated vocational training in cybersecurity makes it difficult to draw conclusions about Indigenous students. It's not really possible to construe a strong trend from one year of completion data (Figure 14). In 2020, 1,000 Australians completed cybersecurity vocational training at Certificate IV level, ~1% were Indigenous (nine students) (Figure 15).[79] Completion rates for the Certificate III are also low, although it's important to note that completion data is preliminary at the time of writing.

Figure 14: Completions, non-Indigenous students, Cybersecurity and Information, Digital Media and Technology certificates
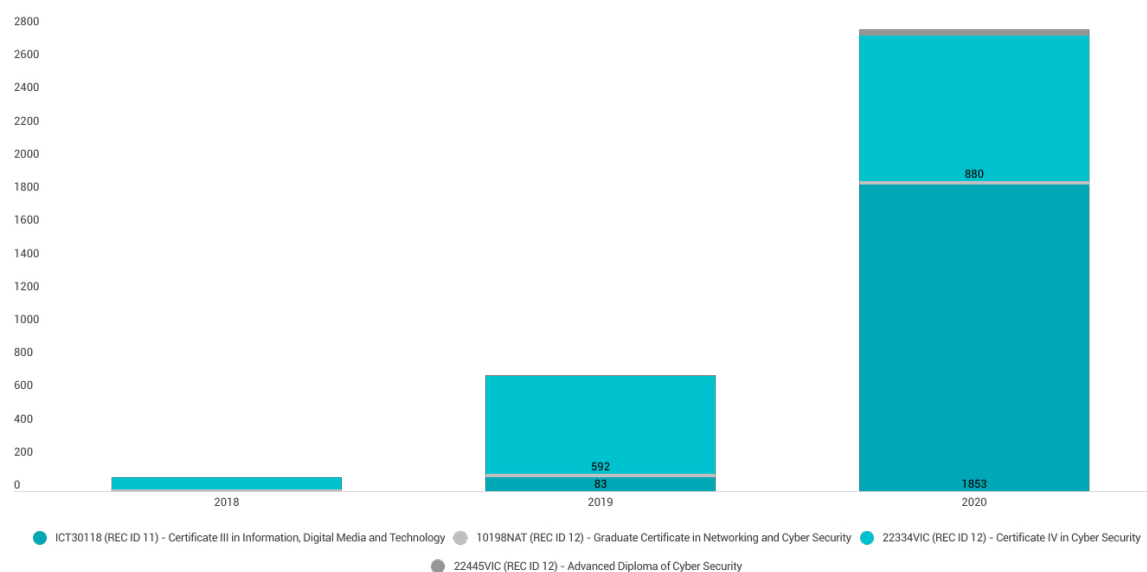
Source: NCVER.

Figure 15: Completions, Indigenous students, Cybersecurity and Information, Digital Media and Technology certificates

Source: NCVER.

The vocational qualification in cybersecurity began in only 2018, and enrolments have been concentrated in the southern Australian states. However, the initial numbers indicate a degree of interest by Indigenous students, particularly at the Certificate III level. Ensuring completion rates and pathways into the Certificate IV qualification is essential.

The Certificate III qualification provides the skills and knowledge for an individual to be competent in a wide range of general ICT functions. It's a prerequisite for advancing to the six-month and on-campus course.

People working at this level will support ICT activities in the workplace in a wide range of areas, including technical support, network administration, web technologies, software applications and digital media technologies.

Policy brief: Building genuine trust: a framework and strategy for Indigenous STEM and cyber pathways

Trends in recent years show that, in VET for Indigenous candidates, the Certificate III and IV qualifications are acting as pathways to higher level qualifications.[80]

Indigenous enrolment in vocational education has previously been characterised by high enrolments in lower level (Certificate I and II) qualifications. However, that's been changing over the past decade, and there's now a trend towards higher level qualifications (Certificate III and above).[81] The trend is less pronounced in remote and very remote areas.[82] The trend has been influenced by the National Agreement for Skills and Workforce Development, which aims to raise education levels and provide greater access to Certificate III and higher qualifications.

Completion rates are lower for Indigenous candidates than for non-Indigenous candidates. In all jurisdictions, data from the National Centre for Vocational Education Research shows declining rates of completion in all fields of education over the five years to 2020 (Figure 16). This is particularly the case for engineering completions, which numbered 7,550 in 2015 and 4,616 in 2020.

Figure 16: Completion rates in vocational education in all fields of study for Indigenous candidates, 2015 to 2020
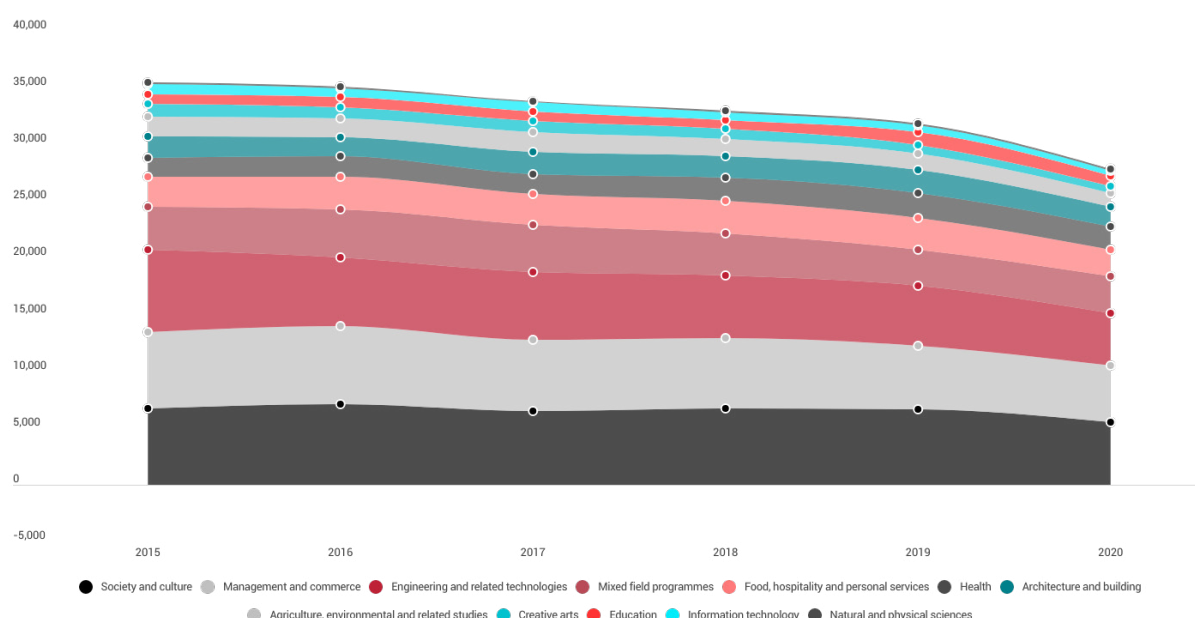
Source: NCVER.

The Australian Government announced a new 'industry cluster' model in 2022 to address past and current challenges for industry engagement in vocational education.[83] The new model will replace the current industry engagement system, including the 67 industry reference committees and six skills service organisations (SSOs). Stakeholders have consistently stressed the need for a stronger, more strategic role for industry and a smaller number of industry-led organisations.

The new industry engagement arrangements elevate industry leadership in VET so industry can more effectively address current workforce challenges and prepare for new and emerging skills needs. Ensuring that Indigenous participation and completion are addressed as part of these sector plans will be important. Section 3.5 reports on how industry is trying to link training with employment pathways.

3.3. University enrolments

One of the things I think we know about higher education is that, for Indigenous people who go through and complete a higher education degree, their outcomes are the same as for the rest of the population. It's completely life changing. The ability to get more people into higher education experiences and to retain them is very important.

—Julian Leeser MP, chair of the Standing Committee on Indigenous Affairs[84]

University representatives at James Cook University and Charles Darwin University report that Defence could increase the frequency of its current engagement. Increasing Defence resources in these locations (Indigenous liaison officers, Special Recruit Team Indigenous) could result in more focused recruitment efforts. Defence recruitment teams make visits on careers days, but fuller engagement may result in higher recruitment. Given the higher numbers of Indigenous women graduating from university, a more concerted strategy to demonstrate the possibilities of defence careers may increase women's participation, particularly in areas of defence with health pathways.

In 2020, the total number of Indigenous Australians in higher education was 23,659. The biggest shift in total university enrolments occurred around 2008 (Figure 17). It coincided with a number of high-level government programs initiated by the Rudd government, including the initial National Indigenous Reform Agreement, which set out the six original Closing the Gap targets.[85]

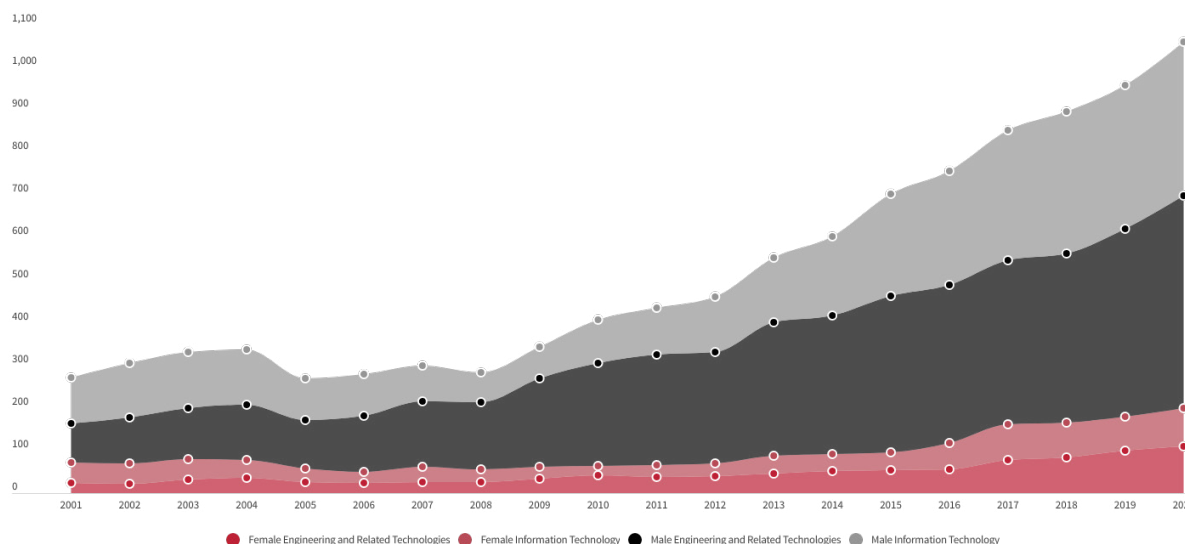Figure 17: Indigenous higher education enrolments, 2001 to 2020
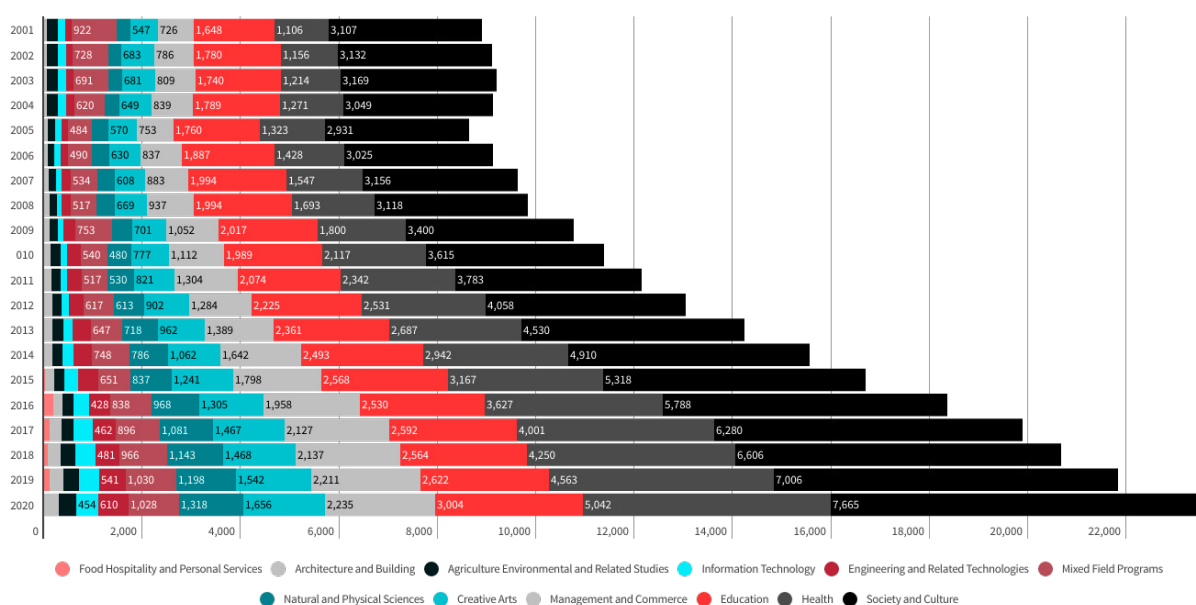
Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

A pipeline of university-qualified Indigenous people is approaching. In 2020 there were 110 Indigenous women and 499 Indigenous men enrolled in engineering degrees in Australian universities. Across all jurisdictions, the enrolment growth rate for all courses was 8.7% more than in 2019.

Enrolments and completions in higher education IT courses have stagnated for 20 years, and those in professional engineering courses have risen but only for Indigenous men (Figure 18). With 58 more Indigenous men enrolling in engineering in 2020 than in 2019, that represents a 13% growth rate.

Also in 2020, IT degree enrolments included 362 Indigenous men (up 7% from 2019) and 90 women (up 13%). Indigenous students make up a very small percentage of the total domestic cohort for engineering and IT, but 10% of the domestic enrolments in mixed-field programs (Table 5).

Figure 18: Male and female IT and engineering tertiary enrolments, 2001 to 2020

Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Table 5: Indigenous higher education enrolments and percentage of domestic cohort, 2019

Gender	Field of Education	Number	% total domestic cohort
Female	Information Tech	79	1.05
Female	Engineering	100	0.86
Female	Natural and Physical Sciences	670	1.26
Female	Mixed Field	751	10.58
Female	Creative Arts	942	2.03
Female	Management and Commerce	1214	1.42
Female	Education	1980	2.37
Female	Health	3590	2.19
Female	Society and Culture	4936	2.65
Male	Mixed Field	279	7.96
Male	Information Tech	338	1.02
Male	Engineering	441	0.81
Male	Natural and Physical Sciences	528	1.04
Male	Creative Arts	600	2.04
Male	Education	642	2.18
Male	Health	973	1.72
Male	Management and Commerce	997	1.03
Male	Society and Culture	2070	2.14

Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Indigenous women currently make up two-thirds of the enrolment in higher education, predominantly in courses related to health, education and law (Figure 19).
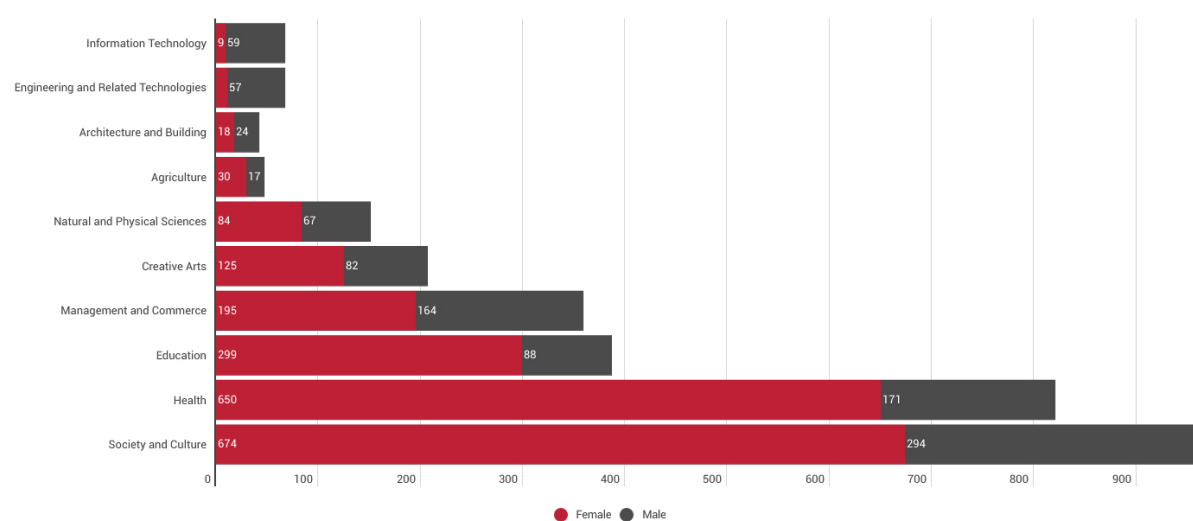
Figure 19: Indigenous higher education enrolments, 2020
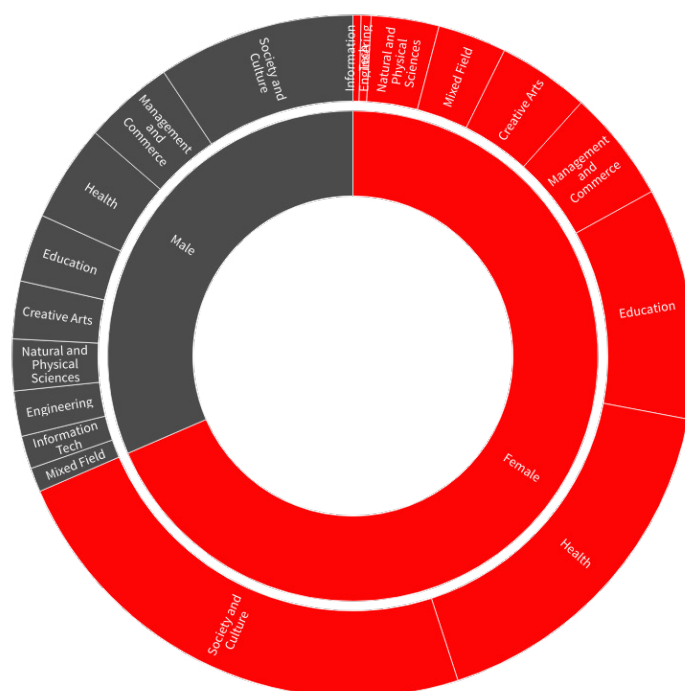
Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.
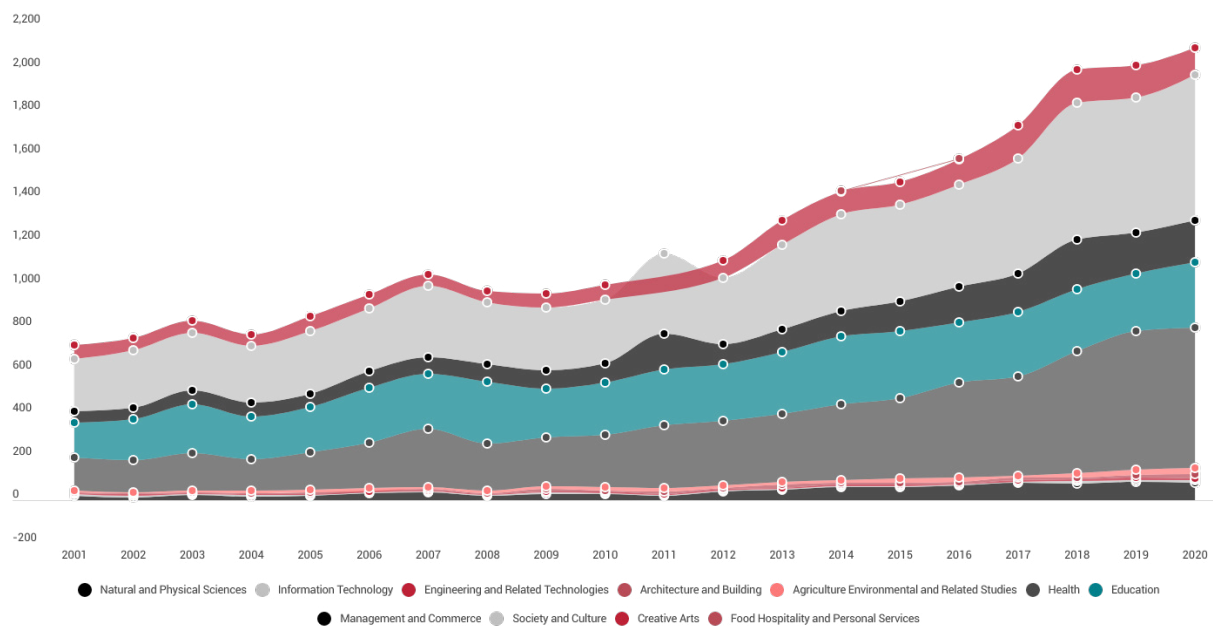
That same pattern is observed in completions: 2,095 Indigenous women and 1,023 Indigenous men graduated in 2020 (Figure 20). Completions were concentrated in the fields of society and culture, health and education. Over the 20 years to 2020, completion numbers steadily increased for Indigenous men and women (figures 21 and 22).

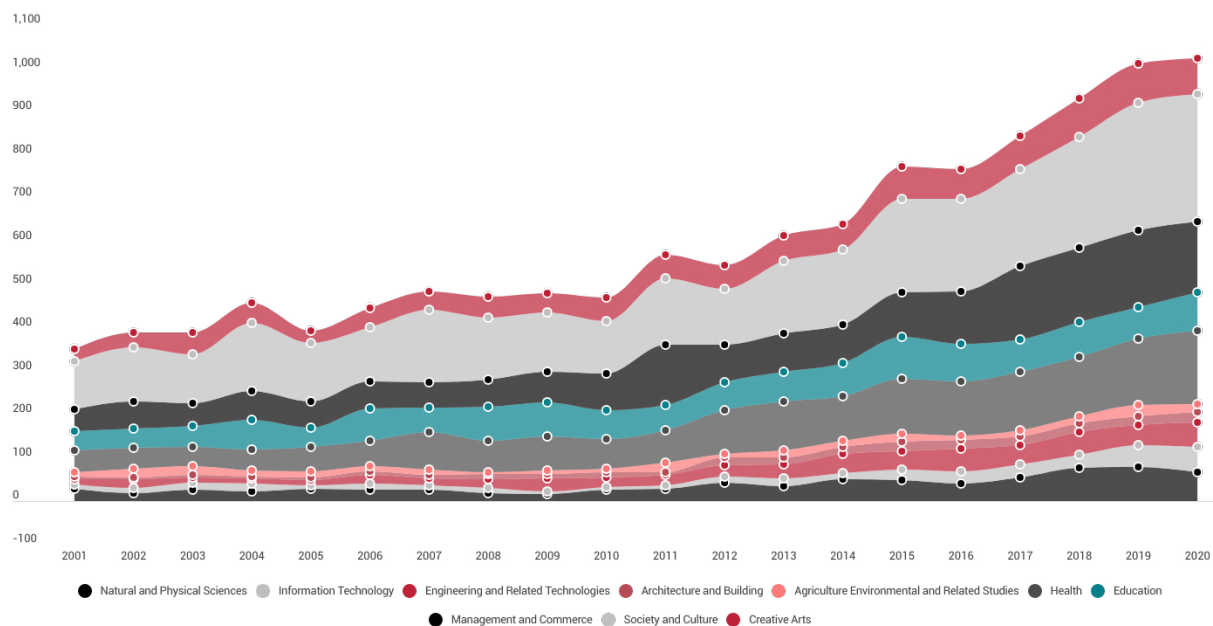Figure 20: Female and male Indigenous higher education completions, 2020

Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Figure 21: University award completions, female Indigenous, 2001 to 2020

● Natural and Physical Sciences   ● Information Technology   ● Engineering and Related Technologies   ● Architecture and Building   ● Agriculture Environmental and Related Studies   ● Health   ● Education
● Management and Commerce   ● Society and Culture   ● Creative Arts   ● Food Hospitality and Personal Services

Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Figure 22: University award completions, male Indigenous, 2001 to 2020

● Natural and Physical Sciences   ● Information Technology   ● Engineering and Related Technologies   ● Architecture and Building   ● Agriculture Environmental and Related Studies   ● Health   ● Education
● Management and Commerce   ● Society and Culture   ● Creative Arts

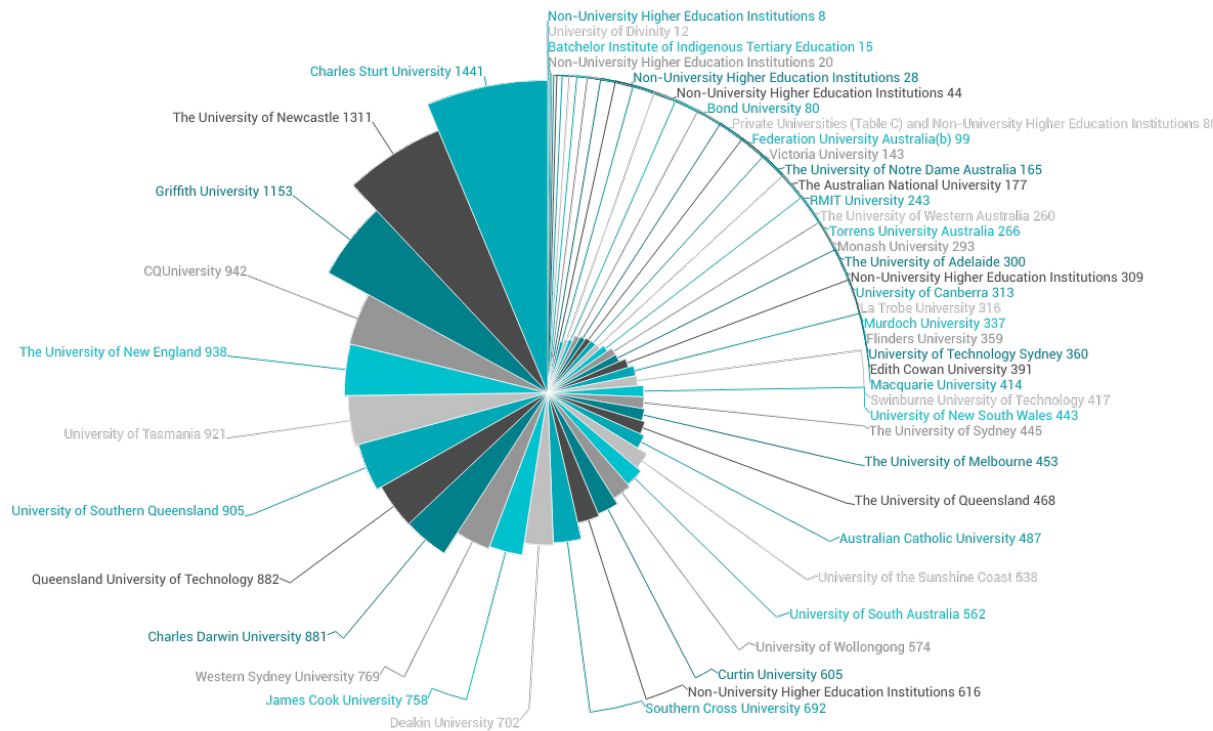Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

A little over 50% of Indigenous students are enrolled at 13 campuses out of 42 universities (including non-university higher education institutions) (Figure 23). Five of those universities are in Queensland (Griffith, Central Queensland University, University of Southern Queensland, Queensland University of Technology, James Cook University), five in New South Wales (Charles Sturt University, University of Newcastle, University of New England, Western Sydney University, Southern Cross University), and Charles Darwin University (Northern Territory), Deakin University (Victoria) and the University of Tasmania round out the rest. Most Indigenous students are studying in New South Wales (35%) and Queensland (26%), with Victoria making up a further 12% (Figure 24).

Figure 23: Indigenous higher education enrolments and institutions

Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Figure 24: Indigenous higher education enrolments, by state and territory
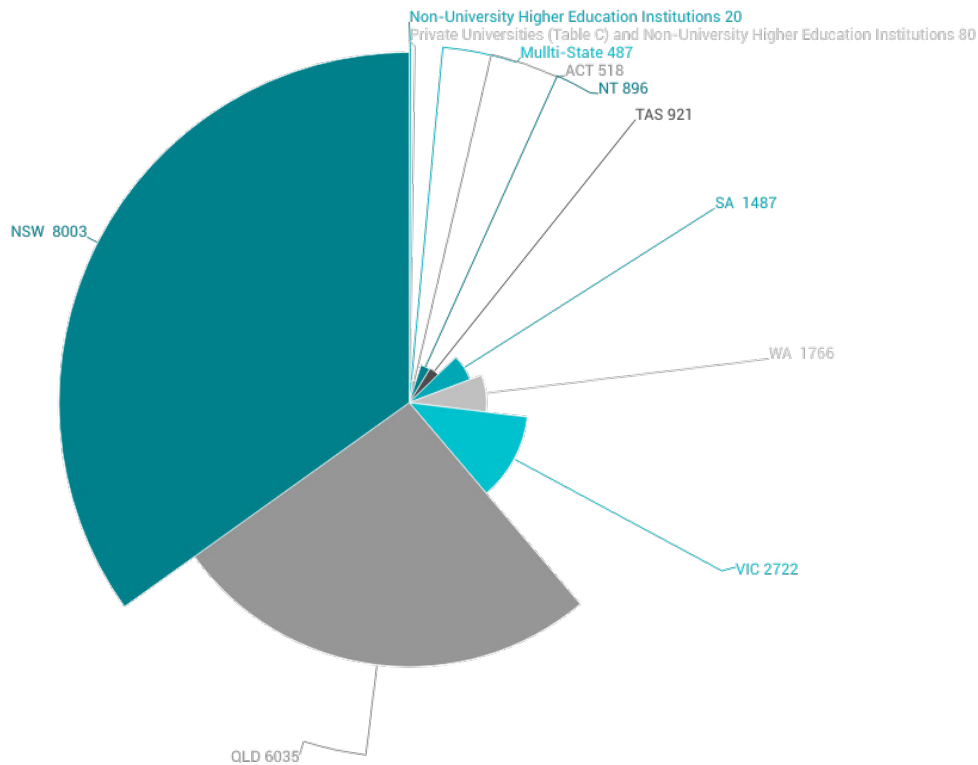
Source: Department of Education, Skills and Employment, 'Higher education statistics', Australian Government, 2020.

Universities face two overarching yet interconnected challenges: attracting Indigenous students to university and attracting Indigenous students to the STEM disciplines. Enrolments in STEM-related higher education degrees have for a long time been subdued, and the sector as a whole is heavily gendered (Indigenous women make up two-thirds of total Indigenous enrolments). The macro picture is of rising enrolments in degrees in society, culture and health-related degrees.[86] Enrolments of Indigenous students are heavily concentrated in welfare studies, particularly social work and childcare.

It's also important to understand the way that STEM disciplines are taught to Indigenous students on many campuses. A comprehensive evaluation study of strategies to increase STEM studies at Charles Darwin University and the Batchelor Institute of Indigenous Tertiary Education found that flipping or inverting the perspective on STEM leads to higher levels of engagement.

The approach is underpinned by a 'both-ways' philosophy of working between and across Indigenous knowledges and Western science and pedagogical approaches. Rather than it being about fitting Indigenous Australians into conventional STEM education, it's about starting with the Indigenous perspective and finding complementarities with Western science. In other words, this means adapting strategies to local Indigenous communities across the country. This is also the approach taken by the CSIRO Indigenous STEM program, which demonstrates the link between the traditional ecological knowledge of Australia's Indigenous people and the science curriculum, which has been delivered to 24,000 Indigenous students, 2,768 teachers and assistant teachers, and 603 schools.

A systematic review of Indigenous science programs in Australia, Canada and the US found that most of the programs employed multifaceted approaches, and that cultural relevance and scientific inquiry were the two main features of the programs.[87] All the programs reported positive outcomes in relation to Indigenous students' science learning, their understanding of their own cultures and traditions, the complementarity of Western science and Indigenous knowledge, or combinations of those three outcomes.

The Australian Council of Learned Academies compared international experiences of Indigenous students in STEM education and found common themes in effective practices:[88]

- developing culturally responsive curriculum and teaching approaches, including specific attention to the learning needs of Indigenous students
- integrating Indigenous knowledge
- assessment involving culturally valid ways of communication
- developing community outreach
- providing real-life pathways to jobs
- designing parental engagement techniques and tools.

The Australian Council of Learned Academies study also found that VET has an important role in improving STEM education and career outcomes for Australian Indigenous students. VET can provide a pathway to employment, a career, re-employment or higher education.

3.4. High school graduation rates and demographic shifts

Indigenous Australians are graduating from high school at increasingly higher rates, and the proportion of those with Year 12 or equivalent or Certificate III or above qualifications has increased, although it's clear that graduation rates in remote Australia are behind those in other localities. Figure 25 shows the rising number of Indigenous people with Year 12 or equivalent or Certificate III or above qualifications, ordered by remoteness. High school completion or equivalent rates lag in remote Australia.

Figure 25: Indigenous people aged 20 years or over with Year 12 or equivalent or Certificate III or above qualification, by remoteness, 2008 to 2019
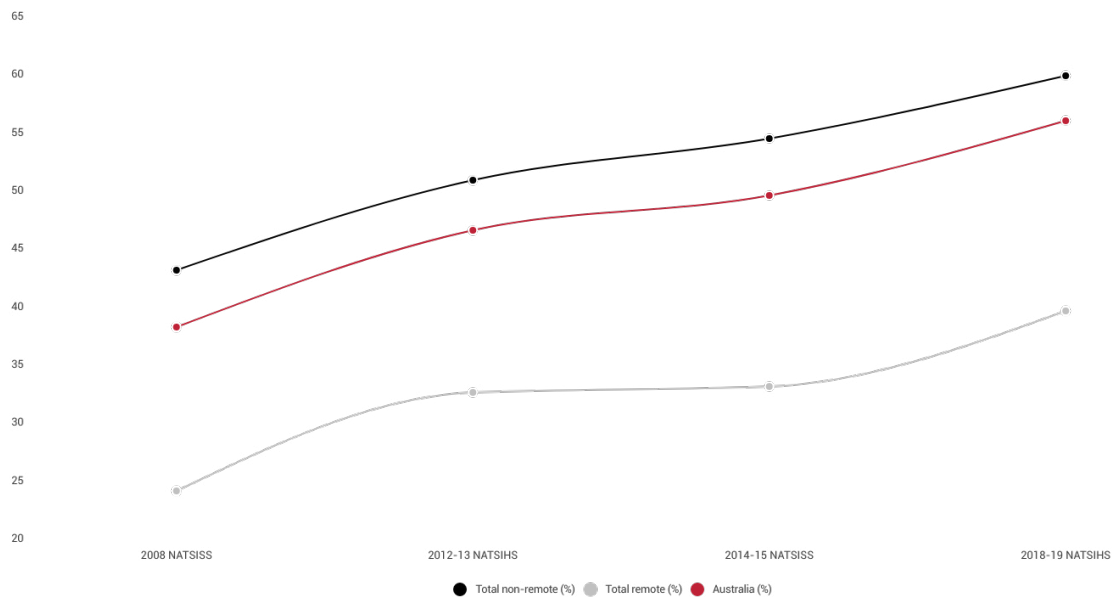
Source: National Aboriginal and Torres Strait Islander Health Survey (NATSIHS).

Figure 26 shows that, over the 10 years to 2018–19, the proportion of Indigenous people aged 20 years or over who finished Year 12 increased by 11 percentage points, while the proportion of people who left school in Year 9 or below decreased by the same amount.

Figure 26: Highest year of school completed, Indigenous people, 2008 to 2019
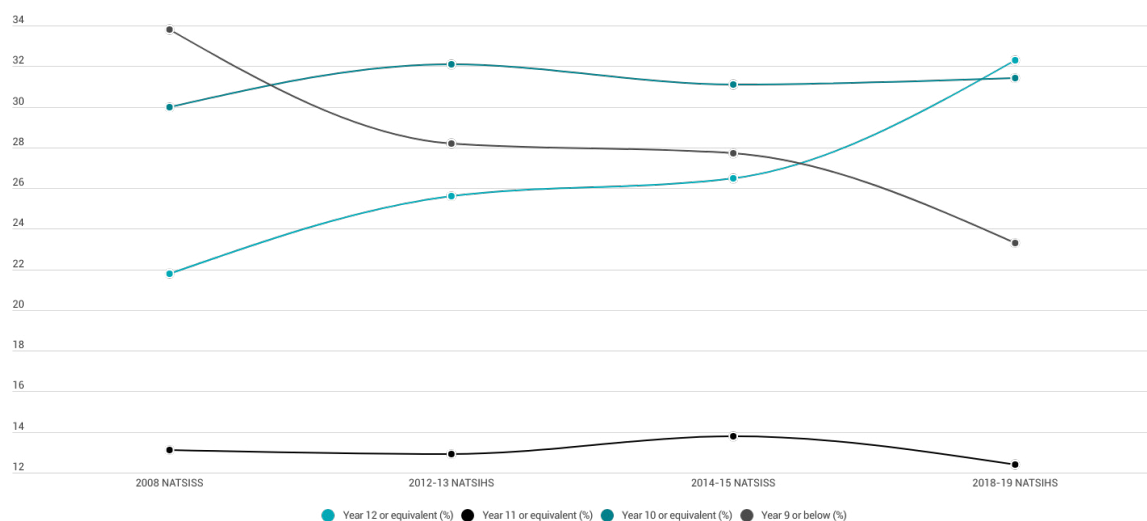
Source: 2008 and 2014–15 National Aboriginal and Torres Strait Islander Social Survey (NATSISS); 2012–13 and 2018–19 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS).

Indigenous Australia is in the midst of a demographic and spatial shift and is projected to grow substantially in coming decades, from 3.3% to 5% of the population by 2051.[89] In the next 10 years, the Indigenous population will increase from ~800,000 in 2016 to between 1,046,000 and 1,093,000 in 2031 (Figure 27).[90] This growth will shift population growth towards the southern capital cities and more populous states and territories, with implications for Indigenous-specific federal funding.

Figure 27: Estimates of state and territory Indigenous population, 2018 to 2031
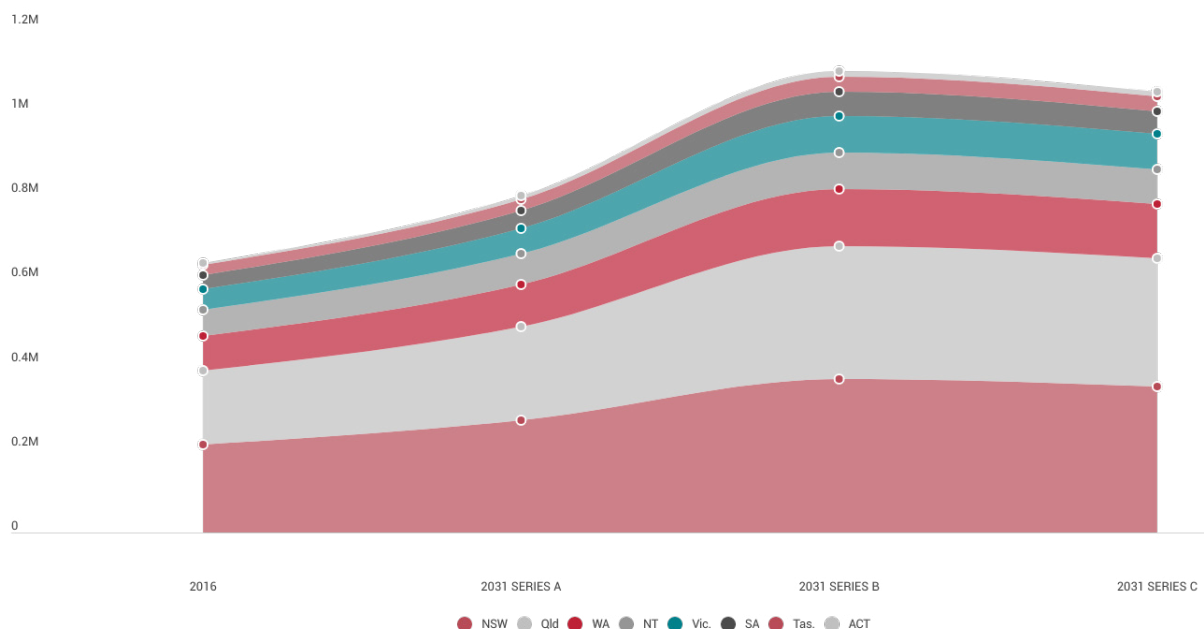
Source: Australian Bureau of Statistics, 'Estimates of Aboriginal and Torres Strait Islander Australians', Australian Government, 2018, online.

Indigenous Australians aren't a homogeneous group, so it's important that Indigenous engagement and employment strategies account for differences as well as commonalities (such as cultural obligations) among Indigenous men and women as well as geographical factors. This is reflected in the National Agreement on Closing the Gap, which acknowledges that some Indigenous cohorts experience greater disadvantage and encourages greater data disaggregation (and consequently different strategies for engaging regional, remote and urban populations).

The tendency will be towards developing programs to target Indigenous groups that are already achieving educational qualifications, rather than developing programs targeting those with relative educational disadvantages, such as those in remote areas. The Defence Indigenous Employment Strategy 2012–17 moved Defence's focus from predominantly engaging with remote communities to also building relationships with regional and urban communities. It's unclear whether, and how, that pivot has affected the focus of recruiting strategies.

3.5. How are defence and technology companies assisting the labour market transitions of Indigenous talent pool?

Discussions with the technology industry and with Defence reveal a common refrain of 'There isn't sufficient supply of Indigenous talent' or the question of 'Where do we find the talent?' Industry certainly has a role to play in advertising that firms have employment pathways into their businesses; however, effective labour-market intermediaries (such as CareerTrackers, which is an Indigenous intern program) are providing end-to-end support, including pastoral care and mentoring to ensure greater completion.[91] The Indigenous business sector is also playing a role as an informal source of labour-market information, training and support. These intermediaries are part of the answer to the question of how Indigenous Australians are navigating the labour market. That is, Indigenous Australians are contacting Indigenous businesses and training companies as the first port of call because those firms know about the sociocultural and economic issues (such as family caring responsibilities) that are part of the experience of being Indigenous.

Supporting Indigenous labour-market intermediaries is how much of the defence and technology sector is supporting Indigenous employment and training (Table 6). In the larger Australian technology sector, there are small initiatives usually funding an Indigenous education and training intermediary.

Table 6: Defence and technology companies' Indigenous training and development programs

Company	Indigenous partner	Training or development program
Accenture	Goanna Education	Unclear
Amazon Web Solutions	Goanna Solutions	AWS Cloud Skills
Atlassian and Avanade	Goanna Education	Front End Web Development and Cloud Architecture Bootcamp
Australian Public Service	Indigenous Defence and Infrastructure Consortium (iDiC)	Delivering training and mentoring to at least 22 Indigenous APS employees
BAE Systems	Indigenous Defence and Infrastructure Consortium (IDIC)	Hunter Class Frigate Program
Baidam	Baidam	Sponsored 10 Indigenous students, paying for industry certifications such as the SANS cyber certification and university scholarships
Boeing	Indigenous Defence and Infrastructure Consortium	Unclear
Boeing	Reconciliation Australia	Reconciliation Action Plan
Cloudstrike	Baidam	Strategic partnership
Cubix	Reconciliation Australia	Reconciliation Action Plan
Defence Materials Technology Company (DMTC)	Reconciliation Australia	Reconciliation Action Plan
DXC technologies	Reconciliation Australia	Reconciliation Action Plan
IBM	Barayamal	ICT and STEM skills

Microsoft	CSIRO/APN Cape York Rangers	Natural resource management monitoring / artificial intelligence
Microsoft	TAFE NSW	Digital apprenticeship
Raytheon	Willyama Services	Unclear
Thales	CareerTrackers	Internship (10 years, 10 university students per year)
Thales	Reconciliation Australia	Reconciliation Action Plan

By addressing Indigenous employment and training via funding an Indigenous training or employment intermediary, these examples are attempting to build robust linkages to training and work through organisations that champion the efforts of Indigenous people. Table 7 identifies the reasons for the low participation of Indigenous Australians in STEM disciplines, including stereotype bias, the burden of low expectations, low- to poor-quality STEM education, limited pathways from school to university to industry, home barriers and proximity barriers.[92]

Table 7: Enablers and barriers in higher education

Enablers	Barriers
The support and understanding, particularly within the family and community, can be crucial for Indigenous young people to feel that they can pursue their aspirations	Institutional barriers include a perceived lack of support and obstacles in accessing the anticipated or required information
The importance of role models, particularly those with experience of university	Inclusion/exclusion of Indigenous content; in some instances there was a lack of identifiable content in the curriculum;
Being a role model for others provides impetus for some Indigenous school students to complete secondary school	A perception that Indigenous knowledges are not valued within the Western academy or that they conflict with Western perspectives on learning and knowledge
Exposure and accessibility to information and experiences are important facilitators of educational and occupational aspirations	Within the university environment, perceptions of cultural insensitivity, a lack of cultural awareness and respect, and lack of engagement with the local Indigenous community
Economic forms of support, such as scholarships and industry partnerships, have been identified as incentives, with knowledge of these schemes similarly found to be important	Experiences of racism within the university, stereotyping, and exclusion and an absence of Indigenous staff and students, are all closely related to feelings of cultural and social isolation experienced by some Indigenous students
Alternative entry pathways to university	Accomodation and child-care related issues on campus, Balancing other commitments within the family and/or community
Relationships between teachers and students, access to resources, and cultural responsiveness within the school environment	Geographic location and travel are key concerns. Experiences of relocation and dislocation from one's family and community
Socioeconomic status has also been found to be related to the aspirations of Indigenous students during school	Low self-esteem, lack of confidence, and self-doubt have also been identified as underlying concerns. This is closely related to academic issues such as developing study skills, time management, and one's perceived ability and educational preparedness and access to appropriate resources and technology

Source: Adapted from Gore et al., 'The participation of Australian Indigenous students in higher education: a scoping review of empirical research, 2000–2016'.

For those who have made it to the point of studying at university, there are few ways for prior learning, particularly TAFE qualifications, to be recognised at universities. Lack of mentorship means that students fly under the radar or are discouraged early in their lives. Fewer Indigenous students study mathematics in schools, which prevents their access to IT and traditional STEM degrees.

Discussions with various levels of government revealed an overemphasis on training rather than on building links with jobs and local industries. That is, young people are directed back to the vocational sector to undertake or attempt (yet) another certificate qualification, rather than being connected with an employer or employment that has meaning to their lives, or that addresses a local labour-market need.

There appears to be an opportunity here for Defence to ensure that its pathway programs are linked formally with labour market intermediaries, such as CareerTrackers. A number of Victorian, New South Wales and Queensland government departments are employment partners.

One Queensland-based education policy analyst described the problem as a tendency to 'over-train rather than employ'. Linking education and training with a job outcome is a key way to maintain the engagement of Indigenous young people in training.[93] Research on Indigenous men shows they're more likely to engage with the vocational system, as it's closely linked with a job outcome.

The lack of connection to employment speaks to a number of issues among the small business sector, and particularly the role played by Indigenous businesses in linking Indigenous youth to scholarship, training and job-market information.

Indigenous young people are cold-calling Indigenous businesses as their first port-of-call to discuss employment and training opportunities or relying on other Indigenous labour-market intermediaries, such as CareerTrackers. This tracks with academic literature on Indigenous employment and recent parliamentary reports that have suggested that the employment rate for Indigenous people in Indigenous businesses is 60% higher than in other businesses.[94]

Recognition of and support for the ways that Indigenous young people are navigating the labour market using informal information networks, relying on Indigenous businesses, means that novel approaches have to be taken to ensure that Indigenous businesses aren't overburdened with administrative responsibilities and to ensure appropriate risk sharing.

3.6. Defence's vocational engagement isn't coordinated around the Indigenous talent pool, and ensuring higher completion rates may require novel approaches, such as greater investment in pre-apprenticeships linked to local skills needs

Defence has a weak presence in the vocational sector. Growing that presence is probably the key to growing Defence's Indigenous workforce in the medium term. Defence is engaged with the sector but needs to systematise its engagement with the emerging cohort, particularly through signature initiatives such as the ADF Cyber Gap program and the Cyber Defence College.

Defence has unique engineering skill needs but is wedded to enrolment trends in the wider training environment, in which there are shortages in engineering and cybersecurity skills in particular. That leaves Defence to be a 'price taker' for whatever pipeline of qualified workers is produced by the training sector. In an increasingly competitive employment market, that's a poor position for Defence to be in. Indigenous personnel tend to have certificate-level qualifications and so tend to be overlooked in the search for university-qualified or higher level certificate qualified people.

There have been some key initiatives to boost the supply of talent to meet emerging skills needs, but there's no clear Indigenous focus:

- The Morrison government announced the $10 million Defence Industry Pathway Program developed in partnership with Western Australia's South Metropolitan TAFE and the maritime defence industry as a 'taster' course designed to set participants on a path to a defence industry career. There's no apparent Indigenous engagement plan.
- In Western Australia, North Metropolitan TAFE has had some preliminary talks with the Australian Army's 13th Brigade about cybersecurity training. The partnership is still at a very early stage.

Increasing Defence engagement will work only if attention is paid to the reasons for non-completion and if institutional settings are arranged around increasing completion rates.

Funding of pre-apprenticeships through Indigenous registered training organisations could allow for higher completion rates and closer alignment to the cultural needs of learners.[95] This would allow an Indigenous registered training organisation to set standards and undertake pastoral care, and it would defray the administration costs of the Indigenous business sector.

A study of labour market training provision to Indigenous vocational students found that enterprise registered training organisations set high barriers to entry because they wanted to avoid 'setting students up for failure'.[96] That was also the case within the TAFE system, in which selection testing was used to identify deficiencies in students' literacy, numeracy and social skills, which were subsequently addressed in the course of training.

In that study, the other factor that increased articulation rates from pre-apprenticeships to apprenticeships was training to meet the needs of the local labour market.[97] When providers established a close link between local labour-market needs and the trade occupations that were the subject of the pre-apprenticeship, completion rates increased. Training was either matched generally to occupations known to be in demand locally or it was tied to particular projects, such as large local investments requiring apprentices. The absence of a close 'fit' between training and local labour market needs was observed to produce comparatively adverse outcomes for its students.

3.7. Vendor training and the cyber curriculum

There are high barriers to entry into vendor-provided training for Indigenous candidates. In the IT industry, the training landscape can be characterised by vendor-based credentials (that is, candidates receive training in the Microsoft, Google, Cisco or other suites of software), microcredentialing and digital credential stacks, as well as digital apprenticeships.[98]

A major challenge is that 'the proliferation of alternative credentialing standards—driven by the rapid adoption of non-traditional, work-based, short, and vendor courses—has resulted in a confusing array of training options of varying quality and relevance.'[99]

Navigating through these training options is difficult. There have been embryonic pilot projects that have been attempting to mobilise Indigenous training providers in the provision of digital training, but they're at an early stage.

In engineering and cybersecurity, there's a need for both those with professional qualifications (such as a bachelor's degree) and those with technical (such as certificate-level) qualifications. The challenge with cybersecurity qualifications is that they're new and the curriculums, standards and levels of proficiency vary significantly among states in Australia.

The curriculum in the vocational education sector is being developed in collaboration with the cybersecurity industry, within which many players have competing priorities and varying levels of understanding of the overall needs of the sector and the place of cybersecurity skills in the wider economy.

4. Defence plays an agenda-setting role in the broad STEM environment

Engineering is inextricably linked to the functioning of contemporary militaries and the defence organisations and industries that support them.[100] The Australian Defence organisation has broad and diverse needs for scientists and engineers. As Dr Andrew Davies argued in a review of the capability of Defence's physical science and engineering workforce:

> Defence needs engineers and scientists. It needs engineers to help it identify and manage risk in projects and to manage its fleet of complex platforms and complex data and communications architectures. It needs scientists to collect data and conduct research that help inform operations and force structuring decision making and to investigate novel and promising technologies … Engineers in Defence are mostly about managing and reducing risk and uncertainty … while scientists require uncertainty to have sufficiently worthwhile problems to examine.[101]

Although the ADF has its own skill needs, it's important to note that the broader STEM economic policy agenda is driven by the necessity 'to lift the *general quality* of the supply of human capital and enlarge the high-skill group capable of research, commercialisable innovation and effective response change.'[102] STEM qualifications prepare graduates for a broad range of occupations, including management positions.

The STEM and cybersecurity economic agenda is about skills and innovation and the relationship to national economic development as well as national security. From the literature on economic development, we know that certain forms of skills-development systems support certain modes of innovation that can become self-reinforcing ecosystems.[103] Research on skills ecosystems highlights that clusters of high-, intermediate- and low-level competencies come together in a particular region or industry and are shaped by interlocking networks of firms, markets and institutions.[104] This means that technical education in the vocational system is also important, alongside tertiary education. Technical education provides an alternative entry path that avoids the need for tertiary qualifications as minimum entry criteria for technology-based roles.

As Defence is reliant on the pipeline from schools, universities and the VET system, it's wedded to the enrolment trends in those sectors. Defence funding comes into play in approximately 50% of STEM initiatives at the national level, which include initiatives by Defence Science and Technology, the Department of Home Affairs, the Australian Security Intelligence Organisation and the Australian Signals Directorate (Figure 28). This means that the priorities set by Defence play an outsized role in setting the agenda across the national landscape.

In the face of current labour shortages, there's an increased sense of urgency in government and Defence regarding STEM, cyber and digital skills. According to figures from AustCyber, between '2017 and 2020, the cybersecurity workforce added approximately 4,000 workers (for a total of 26,500 workers)'. Current growth (in Indigenous and non-Indigenous numbers) isn't sufficient to cover the rapidly increasing demand for cybersecurity specialists, according to the sector competitiveness plan produced by AustCyber.[105]

Figure 28: Lead agencies of STEM programs
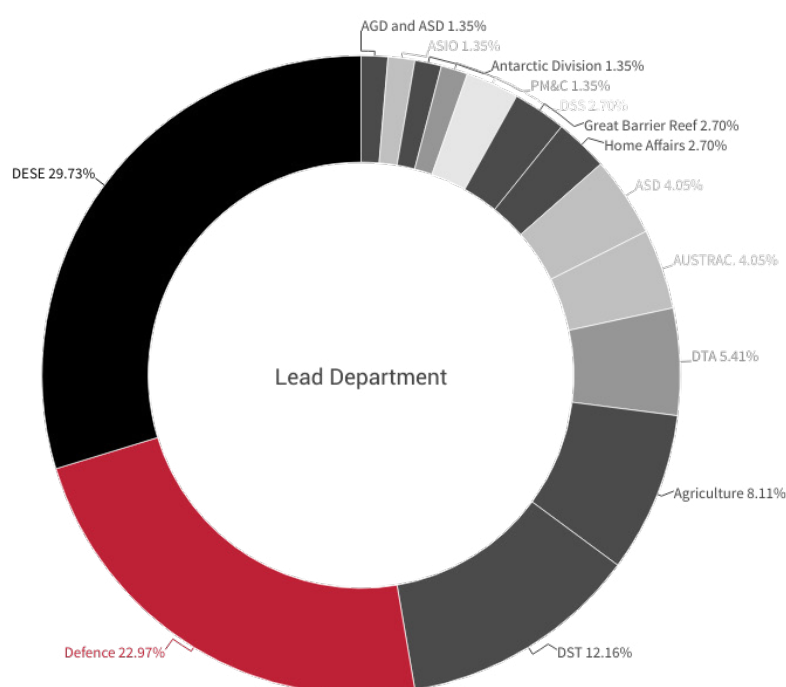
4.1. The broader STEM education environment needs stronger attention to Indigenous men's and women's education pathways

Until 2021, there were no Indigenous science or technology initiatives funded by the Department of Education, Skills and Employment or other federal agencies, and currently there's no national initiative addressing boys' education.

In 2021, the Department of the Prime Minister and Cabinet launched the Indigenous Girls STEM Academy—a collaboration with CSIRO and the CareerTrackers Indigenous paid internship program. The STEM Academy aims to provide comprehensive support to Indigenous women in STEM studies from middle/late high school through to university and on to graduate entry into careers. This is a $25 million dollar investment that seeks to support high-achieving Indigenous women and girls who aspire to study and secure jobs in STEM professions.

The only Indigenous STEM program that has a national imprint is run by CSIRO and was funded by the BHP Foundation until 2021. There are a number of state-based STEM programs, including the National Indigenous Science Education Program based at Macquarie University and ATSIMS (Aboriginals and Torres Strait Islanders in Marine Science) at James Cook University.

The NSW Government recently announced a 10-year $25 million grant to the Science and Industry Endowment Fund to establish the Generation STEM program with the CSIRO. Although the program isn't entirely Indigenous-focused, it has strong Indigenous components. More importantly, it establishes that STEM education should be a long-term commitment.

4.2. Many digital skills training programs are still in their infancy; the new 'industry cluster' model should bring faster matching of industry skill needs with education and training initiatives

It's increasingly common for IT practitioners and people working in the technology industry to start their careers in other industries. However, despite that, there's insufficient thinking about, and programs that target, other areas and industries to source talent.

Cybersecurity is an important cross-cutting skill and ranges from basic cyber literacy to advanced skills. Working in this area requires other competencies and attributes, such as critical thinking and communication skills. The complex nature of hybrid threats suggests a need for diverse thinking and an array of knowledge. Oversubscription to the view that cyber jobs are only technical roles may mean that recruitment efforts miss 'latent' skills and capabilities that are just as important to digital jobs.

A survey of 4,753 cybersecurity professionals working globally found that, while an IT background was the single most common route into the sector (47% of respondents), slightly more than half of respondents got their start outside of IT: 17% transitioned from unrelated career fields, 15% gained access through cybersecurity education, and 15% explored cybersecurity concepts on their own.[106] Younger professionals (<39 years old) were less likely to have started in IT before transitioning to cybersecurity, compared with older professionals.

Part of the challenge for recruiting into areas of digital government is to demystify the technical skill requirements of 'technical' roles and the training requirements. An overdependence on the Skills Framework for the Information Age, particularly in the public sector, overlooks the importance of non-technical skills. It's certain that there are some base-level requirements, such as Year 10 or 12 mathematics, but equal effort has been made in government jobs frameworks to emphasise the strong elements of 'human skills' that are required in digital skills.

Oxford Economics and Cisco say that 350,000 people in Australia will move into roles that need increases in 'human' skills, including skills in active listening, speaking and critical thinking. This is consistent with the way that the Digital Transformation Agency is building the 'digital capability' of its workforce.

Equally, it's important to have a range of skills and qualifications (both professional engineers and qualified technicians) within IT and engineering jobs.[107] Although there's a lot of hype about the disappearance of routine manual jobs, crewed, multi-role platforms or human–machine teaming will continue to play a key role in defence operations.[108]

Over the past 10 years, efforts have been made to systematise cyber and information security roles into defined roles, capabilities and proficiency levels within government. In 2018, the Australian Signals Directorate (ASD) cyber and information security 'stream' was reviewed to ensure that job roles related to current industry and government frameworks and standards.[109] As a result of that review, the ASD Cyber Skills Framework was formed, bringing together nine roles using a set of underlying core capabilities and related skills and proficiency levels. Those concepts were developed from three core frameworks: the Chartered Institute of Information Security Skills Framework; the Skills Framework for the Information Age; and the Integrated Leadership System.

However, those frameworks however are useful only if they communicate base-level expectations, training opportunities and staged requirements in a manner that's clear. As shown in Section 2.3 of this report, unless qualification expectations are clear for applicants, they'll search elsewhere.

Defence has two cyber-related talent programs. Both are in early stages, but neither has any visible Indigenous engagement strategy:

- The ADF Cyber Gap program hasn't targeted Indigenous candidates specifically, although it was designed to attract diverse candidates.
- The Defence Cyber College at HMAS Harman in Canberra, which is scheduled for completion in February 2023, will house the soon-to-be-established Defence Cyber College, which will enable full-spectrum cyber training for the Defence cyber workforce. Whether it has an Indigenous recruitment target or not is unclear.

There are data skills training projects (both Indigenous-specific and non-Indigenous) that are at the pilot stage. The number of reported applications for multiple pilots and training programs suggests that there's unmet demand for technology-related training projects:

- In 2021, the Digital Skills Organisation tested a skills-based strategy to teach more than 100 entry-level data analysts through three different training providers.[110] The organisation contracted with private training providers Goanna (an Indigenous education provider) and General Assembly, while Queensland TAFE was the public registered training organisation. The training providers were financially incentivised to guarantee that the graduates found work. Graduates and mid-career, mature-age and Indigenous trainees were all represented. The course's long-term impact will be assessed in 2022.
- Microsoft created the Microsoft Traineeship Program, which wasn't Indigenous-specific. The program received 8,000 applications and had an initial intake of 110 trainees.[111]
- The ADF Cyber Gap program had a pilot intake of 45 graduates and had plans to increase that to 800 participants over four intakes. The second intake in 2022 had more than 1,000 applicants and made 225 offers of places.
- IBM's P-Tech (Pathways into Technology) is currently available in 16 schools in Australia, and more than 3,000 students have participated to date. The P-Tech school model was developed in collaboration with public education partners to provide high school students from underserved backgrounds with the academic, technical and professional skills and credentials they need for competitive STEM jobs. IBM's free online Open P-Tech and Skills Build offerings are promising to increase the P-Tech program's reach into remote, Indigenous and underserved parts of the community, as do similar initiatives by other major technology vendors, such as Amazon and Microsoft.

In 2022, the Australian Government announced a new 'industry cluster' model to address past and current challenges involving industry engagement in vocational education.[112] The new industry engagement arrangements elevate industry leadership in VET so that industry can more effectively address current workforce challenges and prepare for new and emerging skills needs.

Ensuring that these experiments in participation in digital skills can, if they're proven, be moved to scale will be a focus of future skills efforts.

5. The Indigenous business sector needs capacity building to push it up the value chain

Defence, and the Australian Government, currently transact with a growing Indigenous business sector, but the sector is underdeveloped relative to non-Indigenous businesses and in terms of the average value of contracts currently undertaken.[113] The Indigenous Procurement Policy (IPP) is aimed at using the scale effect of Defence purchasing to increase the direct economic impact in communities, as well as to heighten second- and third-order impacts. The third review of the IPP undertaken in 2019 by Deloitte stated that 'there is an over-representation of Indigenous businesses in industries such as in cleaning, gardening, human resources and stationery service.' Contracts data released in 2021 suggests that Indigenous businesses are winning lower value contracts rather than being pushed up the value chain.

Because Defence leads in contract volumes, there's an expectation that it will drive the next phase of policy reform and growth. An enhanced agenda might look to greater reform in the small and medium-sized enterprise (SME) sector, but many Australian Indigenous businesses are more microbusinesses than SMEs. It might be possible to advance niche reform areas such as small business incubators, pushing veterans' business development financing mechanisms such as a venture capital endeavour.

However, in the meantime, it's worth advancing mechanisms that are more immediately in Defence's control, such as ensuring that access to relevant information on business opportunities is available on a systematic and structured basis, and that Defence enhances the ability of Indigenous business support organisations to deliver advice on contracting with Defence.[114] Defence prime contractors might also commit to innovating through their supply chains.

Some lessons from global policy on SME growth will assist here, although the lessons will have to be adapted to the Indigenous business context. There's very little evidence-based research on critical success factors supporting the entry of Indigenous companies into defence-sector supply chains. Global examples, such as those in Canada, are project-based investments that set thresholds for employment, with little or no focus on building Indigenous business capacity or engagement.[115] However, the success of Indigenous businesses in the mining and resource sector may offer parallels.

It seems that a number of short-term reforms can help Defence to improve the quality of its procurement outcomes as it drives towards becoming more data-centric as the Data Strategy 2021–23 picks up steam and pushes organisational capabilities further. Defence needs to review its procurement processes, including how it delivers information about procurement and the digital service design. In the short term, it would be beneficial if the central policy-making arm of government committed to an annual review of the IPP so that a regular snapshot, particularly of the value of contracts, drives further development.

5.1. The Indigenous Procurement Policy

The IPP has been a key way to stimulate First Nations enterprise across federal government entities by setting targets of annual contracts to award to Indigenous businesses in each federal agency. Its purpose is to stimulate Indigenous entrepreneurship, business and economic development, providing Indigenous Australians with more opportunities to participate in the economy. The way success is measured is in terms of the increase in the number of Indigenous businesses awarded contracts and the increase in the volume and value of contracts awarded to Indigenous businesses. It's not primarily a mechanism to increase skills development, but there's an implicit assumption that contract volume will convert over time into the ability to deliver higher level projects.

Defence is by far the leading department in terms of contract volume (Figure 29), but not contract value, which is led by the Department of Health (Figure 30) at an average $200,000 compared with Defence's $94,000. In the 2019–20 financial year, the department outstripped its target of 676 contracts and awarded 6,476 contracts worth $610 million to Indigenous businesses. Defence was by far the largest procurer of Indigenous business, with the next largest portfolios being Health ($80 million) and Social Services ($72 million).

Figure 29: Indigenous Procurement Policy, value of contracts, 2020–21 ($ million)
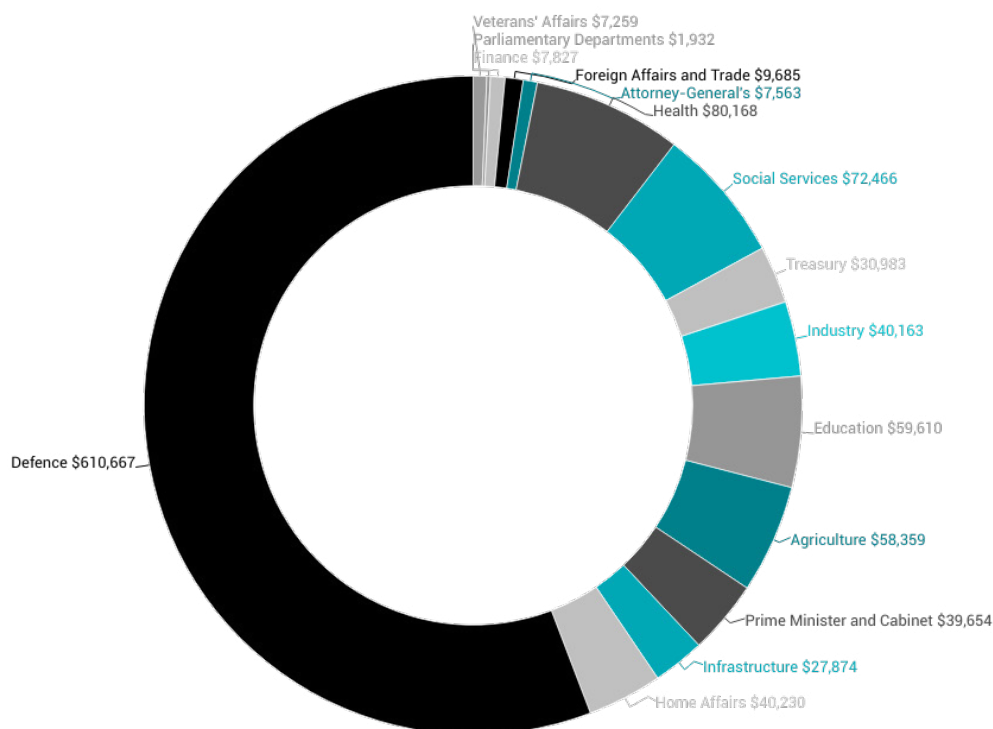
Source: National Indigenous Australians Agency, online.
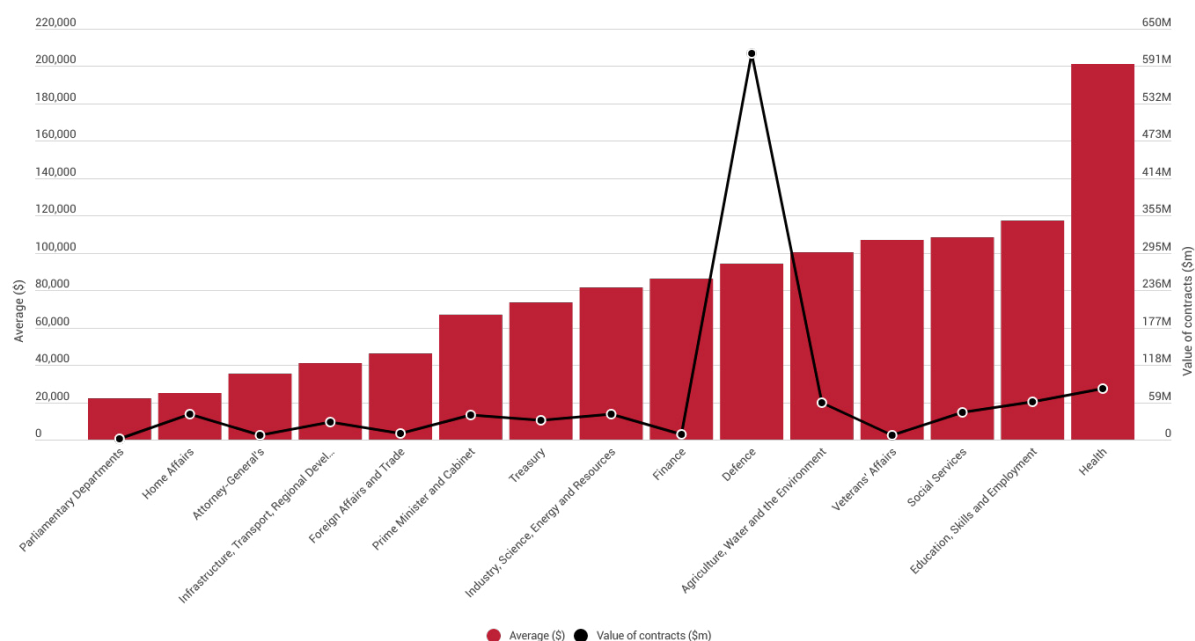
Source: National Indigenous Australians Agency, online.

The Department of Defence exceeded its contract value targets by 600% in the latest data release on the IPP. Although this represented a doubling of contract value (from $300 million to $600 million in the course of a year), a House of Representatives committee report tabled in August suggests the consolidation of the policy to push procurement towards further quality, alongside volume.[116]

When the IPP was initially introduced in 2015, Defence aimed to award 70 contracts to Indigenous enterprises but instead delivered 278 contracts amounting to $159.3 million in that financial year.

The broad structure of the Australian defence industry is shaped like an hourglass, with a 'large number of small firms at the base, a smattering of mid-sized companies in the centre, and large foreign primary contractors at the top'.[117] This creates a number of different dynamics, chief of which is that there's no real incentive for prime contractors to develop 'Indigenous capability' (that is, the capability of the Indigenous business sector).

That hourglass structure doesn't characterise the Indigenous business sector, which appears to be more like a raindrop. If we take contract value as a proxy, it looks as if a vast number of opportunities are available to take on small-value contracts and very few opportunities to take on larger value contracts. Figure 31 shows the value of contract opportunities at different price points—from $1,000 to $7.5 million plus from 2015 to 2018.

Figure 31: Number of IPP contracts, by average value, 2015–16 to 2017–18
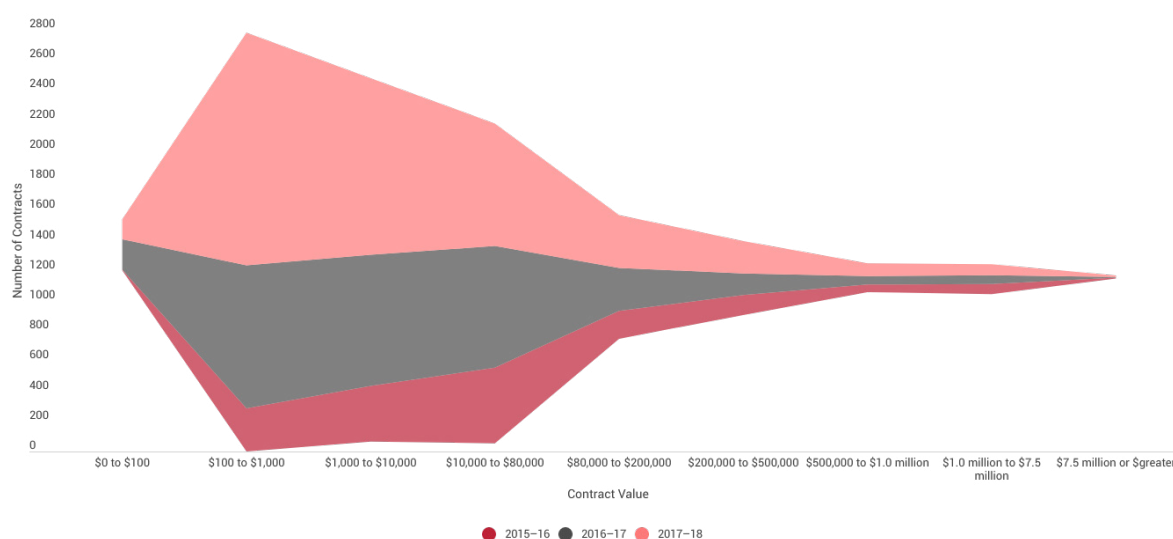
Source: Derived by Deloitte using Department of the Prime Minister and Cabinet IPP data, 2015–16 to 2017–18.

The 2018 review of the IPP conducted by Deloitte for the Prime Minister's Office warned of supply-chain weaknesses and the inability of Indigenous businesses to invest in training to deliver capability uplift:[118]

> While there is a billion-dollar wave in procurement opportunities for Indigenous businesses, the respective supply chain has not been established to adequately meet this wave in a sustainable and efficient manner.

> If Indigenous businesses are not successful in securing work from government, they cannot invest in providing training to their employees, and they do not have the capacity to grow and deliver on larger procurement opportunities to government.

> Training costs for Indigenous businesses may also be higher given there is a 10.0% gap in education attendance rates between Indigenous and non-Indigenous students (and that this gap is wider in remote and regional areas). As a result, many Indigenous people may be starting from a lower base when seeking to build industry ready skill sets.

The headline figures—which are dramatic—tell a story of energised commitment by the government to Indigenous entrepreneurship. However, unless growth of the sector also builds employment and skills development, alongside increasing the number of Indigenous businesses winning contracts, those achievements will become a source of frustration for Indigenous businesses and a means to lock them into lower tier growth.

5.2. Accessing Defence procurement information

Defence should improve SMEs' access to information while also ensuring that it enhances the ability of Indigenous business support organisations to deliver advice on contracting with Defence.

As part of its current procurement information, Defence directs Indigenous businesses to Indigenous Business Australia for business advisory services, but that agency doesn't appear to have the internal capacity and knowledge of Defence procurement to provide that service.

The current page explaining the Indigenous procurement policy (Figure 32) asks users to download an Indigenous Provider Engagement Pack, which includes a paper-based questionnaire and information sheet. Defence will surely start to move these processes into digital systems to improve response times and allow effective triaging of requests for information from Defence. Figure 33 shows a decision-tree that results from following the instructions on the website.

Figure 32: 'Encouraging Indigenous business'

Defence
Indigenous Procurement Policy Team

The Indigenous Procurement Policy (IPP) team within the Department of Defence deal with many aspects of the implementation of the IPP including education and awareness, business matching and reporting.

Indigenous suppliers or Defence Contractors looking to get in touch with the Department of Defence in relation to the above should contact indigenous.procurement@defence.gov.au.

All Indigenous businesses looking to get in contact with Department of Defence for assistance with identifying relevant business areas pertaining to their business, are first requested to access the Indigenous Provider Engagement Pack (ZIP, 507KB).

This will provide you with relevant information and contains a questionnaire for your completion.

In initiating contact with Department of Defence it is requested that you email the completed questionnaire to indigenous.procurement@defence.gov.au to enable us to assist you.

Source: Department of Defence, 'Encouraging Indigenous business', web page, Australian Government, 2022, online.

Figure 33: Decision tree following instructions on Defence Indigenous Procurement page
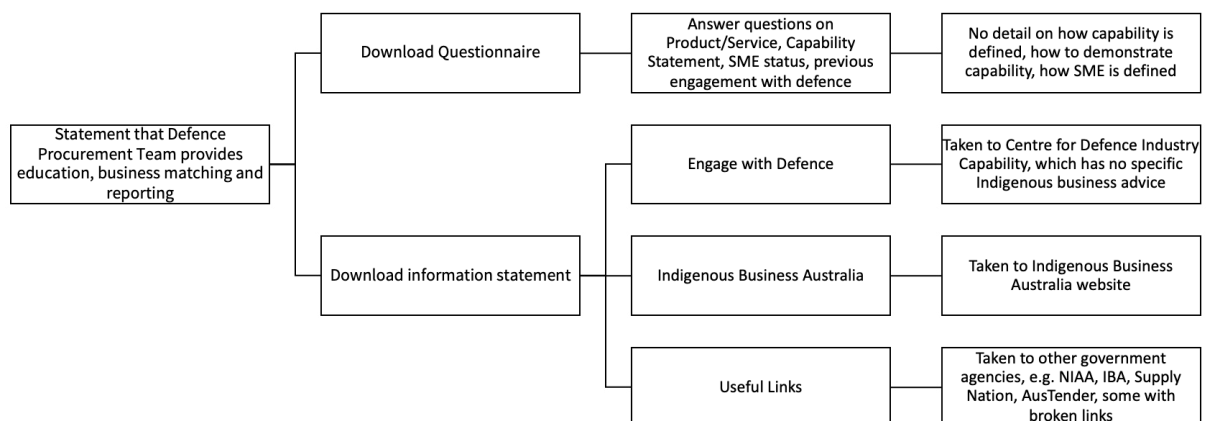
Following the instructions on the procurement web page, businesses are asked to answer the questionnaire on their products and services, whether they're an SME, their business location and whether they're registered with AusTender. They're asked to email that back to the Defence team. This seems relatively straightforward, but various terms ('capability', 'SME' etc.) aren't defined; nor are time frames for assessment or how the process unfolds.

The information sheet that businesses are requested to download directs them in another direction, to the *Business.gov.au* portal. That site has a reference on its 'Find opportunities' page to state and national industry events specifically for Indigenous businesses.[119] However, the click-through is to a page listing industry events (such as the Indo-Pacific 2022 International Maritime Exposition), but none specifically for Indigenous businesses.[120]

Indigenous Business Australia is linked to throughout but has no specialist advisory service on contracting with Defence. Most of its workshops are about business basics, financial management and bookkeeping. It invests alongside Indigenous organisations in operating businesses in a range of sectors, including tourism and hospitality, retail, mining services and renewables, but it's unclear whether it has a history in providing business advice to businesses trying to procure with Defence.[121]

5.3. Tying Indigenous business into training and capability growth

Globally, there are examples of pushing the level of SMEs within defence ecosystems, and, within Australia, regional industry associations designed to push SMEs further up the value chain are emerging, with some Indigenous business involvement.

A House of Representatives committee report tabled in August 2021 suggested some improvements to the IPP after an expansive consultation process with Indigenous businesses that it claimed would push procurement towards further quality alongside volume.[122] The committee recommended an investigation of how Indigenous businesses are defined and that consideration be given to alternative measures, such as the proportion of Indigenous people employed, how skills and training are transferred and how company profits are used to promote philanthropic causes. The committee recommended the expansion of Indigenous business hubs and business networking, the financing of Indigenous housing and business loans, and the alignment of government support for business hubs and employment incubators where Indigenous businesses can receive assistance with tender processes.

SMEs are an essential part of defence supply chains. They play a major role in the economy, contributing to large shares of national employment and GDP. However, labour productivity in SMEs is typically lower than in large enterprises, making the contribution of SMEs to national GDP less than proportional to their contribution to national employment. One of the reasons for lower than average productivity in SMEs is that SMEs are less likely than large firms to provide employees and managers with formal training, whereas successful organisations are thought to invest more in training and development than other organisations.[123]

Global defence SME growth strategies focus on several mechanisms, including improving SMEs' access to information, creating better conditions for them to access defence procurement opportunities, facilitating their access to finance, supporting their involvement in research and innovation, facilitating

the bridge between innovation/technologies and industrialisation/commercialisation, and improving SMEs' competitiveness and industrial performance.[124]

There's very little evidence-based research on critical success factors supporting the entry of Indigenous companies into defence-sector supply chains, but this is potentially an area that Defence can innovate in, as an example to other countries.

There's at least one global example involving a large defence contractor. In 2014, Lockheed Martin Canada launched a targeted strategy designed to open doors for Canadian Aboriginal people to pursue businesses and careers in the aerospace and defence industry. As part of that strategy, the organisation developed a unique training and mentorship program—the JEDI Aboriginal Business Accelerator program—to build opportunities related to Canada's National Shipbuilding Strategy.[125]

With that in mind, there are possibilities to strengthen prime contractor involvement as well as to build Indigenous businesses into existing defence industry associations. In South Australia, the Defence Teaming Centre is an industry association with about 200 organisations, employing 17,000 people, as members.[126] It has at least one Indigenous business in its roster: a labour-hire firm, Indigenous Training and Recruitment. The centre delivers training on how to deliver complex projects in defence through an eight-month executive education style program, which SMEs can participate in at varying levels. Depending on the level of involvement, participants have access to face-to-face workshops, online modules, networking opportunities, legal templates, facilitated introductions, market research and one-on-one export coaching.

It's also clear that Indigenous-owned companies lack financing opportunities.[127] There's the potential to develop a Defence Indigenous business incubator and venture capital fund. A Defence Indigenous business incubator would provide training opportunities, expert advice, networking and events to lift business capability, foster collaboration and partnerships, identify use-cases, and engage between Indigenous businesses in adjacent sectors.

The US Air Force has committed to a number of ventures in order to promote and support small business incubation and financing oriented around defence challenges. AFWerxs is a US Air Force program with the goal of increasing collaboration between internal and external service innovators and entrepreneurs. It has a budget of US$11 million and emphasises the development and implementation of autonomous technologies.

The long-term time lines of defence projects, coupled with an emerging cohort of well-educated Indigenous youth, augurs well for the development of a medium- to long-term strategy and strategic action plan to enhance the participation of Australian Indigenous companies and entrepreneurs in defence supply chains.

5.4. Indigenous veterans also need to be built into sector growth

There are strong crossovers with Indigenous ex-service members who are building businesses to supply parts of the defence ecosystem. However, dedicated government services don't appear to exist to assist Indigenous veterans in business, either as a part of the Department of Veterans' Affairs or the Prime Minister's Veterans Employment Program.

The Prime Minister's program has no resources on its web page directed at Indigenous veterans, or features on success stories of Indigenous veterans in business:[128]

- An Indigenous business, Australian Expedition Vehicles (based in Townsville), won the award for Veteran's Business of the Year in 2021.
- Australian Expedition Vehicles has placed students through the Proud Warrior program.[129]
- Bullroarers Australia is an Indigenous and veteran-owned company, bridging the gap by providing meaningful employment pathways for Indigenous Australians, transitioning ADF members and all security-cleared personnel (PV/NV2/NV1/Baseline) and first responders.[130]

6. Recommendations

In the light of our research for this report, we make the following recommendations.

1. Data and web design

- Develop and implement strategies to increase data capabilities and public reporting of Defence Indigenous participation.
- Publish an annual *State of Indigenous defence report* that details recruitment against targets, retention and attrition, training opportunities, and internal professional development opportunities and time in roles across Defence.
- Develop a public-facing dashboard that demonstrates Defence's progress on Indigenous policy.
- Invest in digital service design to guide Indigenous internet users to pathway programs.
- Develop metrics and reporting to incentivise the leadership's engagement with communities and agencies external to Defence, including education organisations and industry, and the development of Indigenous programs across Defence.
- Develop and deploy surveys and diagnostic tools of Indigenous personnel's experience in the APS and the armed services to ensure that Indigenous experience in Defence is invested in as a resource for strategic thinking.
- Develop an Indigenous Data Strategy to work alongside the Defence Data Strategy 2021–23 so that data gaps in Defence, including on Indigenous suicides and access to veterans' entitlements, are filled, and use Indigenous community and stakeholder information to inform strategic and operational decisions.
- Develop mechanisms for the Army Aboriginal Community Assistance Program to support communities with local data initiatives and community access to data, including by providing certified skills training.
- Establish a community of practice in partnership with central Australian Government departments and Indigenous stakeholders to collaborate on better Indigenous labour-market data.

2. Career pathways

- Develop an Indigenous STEM employment strategy and talent market map that addresses different career paths for men and women and develops regional approaches to recruitment and engagement.
- Fund research into the systemic barriers to Indigenous boys and girls in the STEM disciplines.
- Influence central agencies to establish a national Indigenous Boys in STEM Academy alongside the National Girls in STEM initiative.
- Develop pathways for Indigenous psychologists and other Indigenous health professionals into Defence.
- Develop STEM options for the services' Indigenous development programs.

3. Defence contractors

• Promote reconciliation through Defence's sphere of influence, including among defence contractors.

• Ensure that defence contractors and suppliers, including recruitment advertisers and defence prime contractors, develop reconciliation action plans.

• Support mechanisms for prime contractors to develop training and incubation programs for Indigenous businesses.

4. Engagement

• Develop, in a co-design process, and Indigenous youth engagement strategy (for 15–25-year-olds) that's regionally and culturally differentiated and involves Indigenous youth and elders.[131]

• Develop, in a co-design process, an elder engagement strategy:

  – Appoint an elder at each base.

  – Appoint a dedicated Indigenous cyber elder to promote careers in areas of new capability.

  – Increase the frequency of activity with university and TAFE elders.

  – Increase engagement with Indigenous communities, including the recruitment of additional Indigenous liaison officers, including community elders.

• Develop guidance for services' engagement programs, including the Army Aboriginal Community Assistance Program and the Airforce Kummundoo program:

  – Develop a regional plan of local community challenges and Indigenous economic goals (focusing on land and sea management, energy use and technology infrastructure) tailored for all local communities that Defence operates in or near.

  – Conduct an audit of Defence's local STEM initiatives in its areas of operations and routinise interactions with them through appointing elders to bases or through further resourcing of the Indigenous Liaison Network.

• Increase the visibility of current Indigenous development programs and training pathways through targeted advertising, including to Indigenous communities and the Indigenous business sector.

5. Procurement and business development

• Improve Indigenous supply-chain and social and economic outcomes through procurement, including veterans' employment and business development and by developing Indigenous advisers to procurement panels:

  – Review current mechanisms of the Indigenous Procurement Policy to ensure that procurement panels are effectively procuring from the Indigenous business sector and not reinforcing deleterious outcomes such as 'blackcladding'.

• Develop projects so that Indigenous business consortiums or agencies are equipped with best practice advice on defence procurement in order to provide training opportunities, expert advice, networking and events to lift business capability, foster collaboration and partnerships, identify use-cases, and engage with Indigenous businesses in adjacent sectors.

• Explore avenues to develop financing mechanisms with existing Indigenous finance organisations, including by exploring an Indigenous venture capital fund to address the lack of financing of Indigenous-owned companies.[132]

- Develop small grants programs for Indigenous businesses that link together training provision, scholarships and employment.

6. Veterans

- Develop an Indigenous veterans' business and employment strategy to improve opportunities for Indigenous veterans' employment and businesses.
- Develop an Indigenous veterans' business procurement policy.
- Develop resources for the Prime Minister's Veterans Employment Program and the Department of Veterans' Affairs featuring success stories of Indigenous veterans in business.
- Review and implement guidance to ensure that Indigenous veterans and their families, including those in remote areas, are accessing their full retirement and other benefits.
- Develop programs to encourage Indigenous veterans to re-join Defence in any capacity, including the Reserves.

7. Vocational sector

- Develop a strategic plan for vocational education engagement
- Develop relationships with the VET sector to capture the interest of Indigenous students in the Certificate III in Information Technology and the Certificate IV in Cybersecurity.
- Develop engineering VET credit transfer pathways based on the TAFE SA, Flinders University, University of South Australia and University of Adelaide model.[133]
- Develop the Defence Cyber Industry TAFE Pathway to target cohorts in Townsville, Broome and Darwin, based on partnership with Western Australia's South Metropolitan TAFE and the maritime defence industry.

8. Universities

- Develop strategic relationships between Defence, pro-vice chancellors, Indigenous and university elders-in-residence at the 10 universities with the highest concentrations of Indigenous students.
- Ensure that the Australian Defence Force Academy has an Indigenous engagement strategy in its various departments (such as Engineering).
- Establish research grants dedicated to researching and reporting on the impacts of Defence's past policies and relationships with Indigenous Australians.
- Resource Special Recruit Team Indigenous to increase its interactions with universities by 20% per year.

9. Recruitment

- Review recruitment assessment processes to identify bias against Indigenous candidates and develop recruitment processes to fairly assess Indigenous candidates.
- Review the recruitment universal aptitude test and ensure that there's cultural specificity, and involve Indigenous psychologists in its redesign.
- Develop 'strength-based' or 'resilience-based' criteria and a framework for Indigenous recruitment in consultation with Indigenous psychologists.

- Ensure that a 'human in the loop' is involved in recruitment decisions for Indigenous candidates.

- Increase the availability of Indigenous psychologists' services to Indigenous personnel.

- Ensure appropriate resourcing and training of Special Recruit Team Indigenous.

- Increase the level of cultural training of recruitment personnel, including contractors.

- Appropriately fund and target advertising in media used by Indigenous communities (such as community radio) and during sporting events.

- Introduce cultural awareness training for Defence personnel (specifically, Defence Force Recruitment personnel, commanders and supervisors and human resources personnel) as a high priority.

10. Retention

- Develop and resource training courses for Indigenous Defence personnel, including Indigenous liaison officers, to develop digital skills (alongside other training, such as in finance and leadership).

- Resource Indigenous liaison officers with a training program on how Defence is using digital technologies, including gaming platforms and drones, to assist in engagement.

- Develop STEM training, leadership programs and training on the Defence environment for Indigenous personnel.

- Develop a 'recruit to area' strategy.

- Build a 300- or 400-strong Indigenous civil defence unit, consisting of 18–30-year-olds under guidance from local elders to formalise work experience activities that are being arranged in an *ad hoc* manner at some northern Australian bases.[134]

11. Other public agencies

- Develop and fund research capability on cyber issues affecting Indigenous communities within appropriate public agencies and civil society.

- Develop an Indigenous capability within the Australian Cyber Security Centre that focuses on resourcing Indigenous communities with cyber information, such as a First Nation business manual on issues such as the vulnerabilities of community infrastructure.

- Develop and fund research with Indigenous stakeholders and the research sector on vulnerabilities to Indigenous computing infrastructure and misinformation in Indigenous communities.

12. International partnerships

- Build Indigenous capability within Defence's International Policy Division by working on international relations between Indigenous defence personnel in the Indo-Pacific.

Appendix

Methodology

This research has been a work of engaged research, wherein 'the research not only meets all the standards of traditional scholarship, it aims to meet the expectations and ethical imperatives of community engagement.'[135]

As one Indigenous researcher told the research team during consultations, working with Indigenous people is partly about knowing who is meant to speak, and when to listen. This is particularly important, as it acknowledges with respect the participation of Indigenous members of the ADF, who have given generously their time, knowledge and personal experiences, and the communities of Manbarra and Bwgcolman, who have participated in initial consultations.

ASPI undertook a mixed-method approach involving desktop research and direct consultations and interviews with representatives from 49 organisations.

Research questions and the research approach were conducted in accordance with the Australian Institute of Aboriginal and Torres Strait Islander Studies Code of Ethics for Aboriginal and Torres Strait Islander Research, the purpose of which is to promote ethical and responsible practice in Aboriginal and Torres Strait Islander research in Australia, to increase the contribution of Indigenous knowledge to Australian research, to ensure that research has a positive impact for Aboriginal and Torres Strait Islander peoples, and to continuously improve the quality and standards of research in this area.

In-depth interviews were held with 73 stakeholders, including Indigenous and non-Indigenous representatives of the armed forces (Air Force, 13; Army, 6; Navy, 2), 13 (primary to tertiary) education institutions and agencies, 13 private-sector organisations. We interviewed four Indigenous STEM graduates, with an even split of genders, at various stages of their careers (early to mid-career) to map the steps and support they received. This provided qualitative nuance and personal focus on the barriers to participation.

Reflecting the principles of co-design of engaged research, ASPI facilitated a workshop with Indigenous members of the ADF. Those Indigenous personnel are actively shaping the Defence environment. The overwhelming emphasis of consultations with Indigenous representatives of Defence and in communities has been on the importance of cultivating and (re)building trust with communities so that initiatives confer technological, economic, social and political benefit to them.

ASPI hosted a conference on digital and cyber skills on 23 July 2021 that provided an opportunity to report on initial findings and showcase some of the cyber-related initiatives from across the country. The event had 52 in-person participants and 29 participants online. Participants completed a survey as part of the day's activities.

Indigenous Australians in Defence cyber roles

Within Defence, the Information Warfare Division was established in July 2017 under the Joint Capabilities Group to oversee and develop the ADF's cyber capability. Table 8 details the number of Indigenous ADF members working in defence cyber roles across the services and the percentage of the workforce that they represent. There have been a number of public news articles about Indigenous personnel who have achieved or are achieving cyber roles, including the current Army Elder Aunty Lorraine Hatton.

Table 8: ADF members in Defence cyber roles

Service	Number	% of workforce
Army	70	0.14%
Air Force	34	0.16%
Navy	34	0.17%

Source: Workforce data provided by Joint Cyber Directorate, Joint Information Warfare Branch

Each of the services has developed its own capabilities, including the RAAF's cyber warfare officers and operators, the Navy's cryptologic networks sailors and parts of Army's Signal Corps. It was reported by the Army Research Centre that:

> Each service now has a nascent cyber capability. However, these single-service workforces are frail, with high separation rates. Many of the ADF's relatively few cyber operators feel frustrated by the teething problems of establishing a new capability within each service and, at the same time, are tempted by the promise of higher pay in the private sector or a better developed workforce inside the Australian Signals Directorate (ASD). They also see their colleagues in the Joint Cyber Unit being afforded better opportunities for skill development and deployment.

According to the Joint Capabilities Group, in July 2021 there were 138 serving ADF Indigenous members working in cyber roles:

- Aunty Lorraine Hatton is a Quandamooka Elder of the Noonuccal and Ngughi tribes in southeast Queensland. Enlisting into the Royal Australian Signals Corps, Aunty Lorraine maintained a distinguished and successful career, serving 20 years in the Australian Army, and is now the current Army Elder.[136]

- Proud Kamilaroi woman and Ipswich resident, Pilot Officer Nicola Mitchell, became the first successful applicant from the Air Force's Indigenous Pathway to the Academy scheme to graduate from officer training school. When she attended the Australian Defence Force Academy in 2022 to study a cybersecurity degree with a full scholarship, she became the first member of her family to receive a tertiary education.[137]

- Signaller Isaac Hill and his older brother Lance Corporal Jackson Hill are both telecommunication systems technicians in the Army's Royal Australian Corps of Signals.[138]

Australian STEM, cyber and IT programs and estimated Indigenous cohorts

The Organisation for Economic Co-operation and Development has identified three broad categories of digital skills.[139] In Table 9, the categories have been mapped onto various STEM, cyber and IT programs that have an Indigenous cohort.

Table 9: Categories of digital skills and Indigenous cohorts

	Programs, projects, courses	Indigenous cohort
Category 1: Foundational (digital) skills, including a basic understanding of productivity software such as word processing and spreadsheeting skills, as well as using the internet and being familiar with social media.	CSIRO (Assets)	17,898 alumni
	CSIRO (Prime) Maths	22,000 Indigenous students, 2,000 teachers and 233 schools
	James Cook University (ATSIMS)	n.a.
	Macquarie University (National Indigenous Science Education Program)	4 high schools around northern NSW and western Sydney
	Questacon: Engineering is Elementary	Targets 1,000 teachers
	Virtual STEM Academy (Cyber Challenge)	6,000 students total (not all Indigenous)
Category 2: Digital skills that aren't specific or unique to ICT industries, including an understanding of the application of software for human resources and payroll.	TAFE: Certificate III in Information, Digital Media and Technology	4,429 subject enrolments (2019–2020)
Category 3: These digital skills are specialist and necessary for ICT professionals. The Skills Framework for the Information Age has developed a taxonomy of six broad digital skills categories: strategy and architecture; change and transformation; development and implementation; delivery and operation; skills and quality; and relationships and engagement.	Microsoft digital apprenticeship with TAFE NSW	n.a.
	TAFE: Certificate IV in Cybersecurity	619 (2018–2020)
	Graduate Certificate in Networking and Cybersecurity	13 (2017–2020)
	Advanced Diploma in Cybersecurity	3 (2020)
	University: Bachelor of Computer Science (cybersecurity) Graduate Certificate in Cybersecurity Masters of Cybersecurity PhD in Cybersecurity	417 (2019)

Sources: CSIRO 'Indigenous STEM Education Project' online; NCVER; National Indigenous Science Education Program online; 'Global Tropics Future Young Scholars' online.

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Acronyms and abbreviations

AACAP   Army Aboriginal Community Assistance Program

ABS   Australian Bureau of Statistics

ADF   Australian Defence Force

APS   Australian Public Service

ASD   Australian Signals Directorate

ATSIMS   Aboriginals and Torres Strait Islanders in Marine Science

CSIRO   Commonwealth Scientific and Industrial Research Organisation

EL   Executive level

GPS   Global Positioning System

ICT   information and communications technology

IDP   Indigenous Development Program

IPP   Indigenous Procurement Policy

IT   information technology

SES   Senior Executive Service

SMEs   small and medium-sized enterprises

STEM   science, technology, engineering and mathematics

TAFE   technical and further education

VET   vocational education and training

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