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CHARLES STURT UNIVERSITY

Submission

Select Committee on the Future of Work and Workers

Inquiry on the Impact of Technological and Other Change on the Future of Work and Workers in Australia

20 February 2018

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20 February 2018

Senator Murray Watt
Chair
Select Committee on the Future of Work and Workers
Department of the Senate
Parliament House
Canberra ACT 2600

Dear Senator Watt

INQUIRY INTO THE IMPACT OF TECHNOLOGICAL AND OTHER CHANGE ON THE FUTURE OF WORK AND WORKERS IN AUSTRALIA

On behalf of Charles Sturt University, I am pleased to provide this submission to the Select Committee of the Future of Work and Workers inquiry into the impact of technological and other change on the future of work and workers in Australia.

We have provided extensive commentary and opinion, based on an extensive review of Australian and international literature, as well as our own comprehensive research across regional, rural and remote south-eastern Australia regarding the impact of technological and other change on the future of work and workers. Our commentary and opinion addresses:

- the future earnings, job security, employment status and working patterns of Australians;
- the different impact of that change on Australians, particularly on regional Australians, depending on their demographic and geographic characteristics;
- the wider effects of that change on inequality, the economy, government and society;
- the adequacy of Australia's laws, including industrial relations laws and regulations, policies and institutions to prepare Australians for that change;
- international efforts to address that change; and
- other related matters and considerations in a regional, rural and remote context.

Furthermore, Charles Sturt University's submission to the Committee's Inquiry provides an extensive and detailed range of recommendations that we believe would greatly strengthen Australia's future regional, rural and remote workforce for better economic, social and environmental outcomes for students and our communities across New South Wales and Victoria, as well as the rest of non-metropolitan Australia.

I would be delighted to provide further information to the Committee and would be available to provide evidence at any proposed hearings that you may undertake in relation to considering the merits of the strengthening Australia's future regional, rural and remote workforce capabilities and capacities.

Yours sincerely

Professor Andrew Vann
Vice-Chancellor

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Terms of Reference

On 19 October 2017 the Senate established the Select Committee on the Future of Work and Workers to inquire and report on the impact of technological and other change on the future of work and workers in Australia, with particular reference to:

a. the future earnings, job security, employment status and working patterns of Australians;

b. the different impact of that change on Australians, particularly on regional Australians, depending on their demographic and geographic characteristics;

c. the wider effects of that change on inequality, the economy, government and society;

d. the adequacy of Australia's laws, including industrial relations laws and regulations, policies and institutions to prepare Australians for that change;

e. international efforts to address that change; and,

f. any related matters.

The Terms of Reference for the Select Committee on the Future of Work and Workers inquiry into the impact of technological and other change on the future of work and workers in Australia is provided at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Future_of_Work_and_Workers/FutureofWork.

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1. Recommendations

Charles Sturt University recommends the following regarding the future of work and future workforce capabilities:

1.1 The Future Nature of Work

Charles Sturt University makes the following recommendations:

That:

- ***Technology literacy will be crucial to maximise participation in workforce of the future.***
- ***Future workforce productivity will depend on individual talent that is creative, innovative, entrepreneurial and resilient.***
- ***Individuals, as well as education and training providers, must be incentivised to undertake and provide science, technology, arts, engineering and maths (STEAM) studies, as well as globally-focused commercial studies, particularly international markets and finance.***
- ***Australia must aim to exceed the OECD average for public R&D expenditure in support of the recommendations above.***
- ***Building on initiatives, such as the National Science and Innovation Agenda (NISA), see http://www.innovation.gov.au and the Prosperity Through Innovation Statement of January 2018, see https://industry.gov.au/Innovation-and-Science-Australia/Pages/default.aspx, Australian governments must adopt a national technology transformation agenda, much like the leadership shown by the Victorian Government in the 1990s regarding multimedia.***

1.2 Impact of the Changing Nature of Work

Charles Sturt University makes the following recommendations:

That building on the recommendations put forward above, governments and the private sector will have to not only continue but increase investment in technology infrastructure, as "nice-to-have" infrastructure becomes "critical-utility" for future economic and social development, for example broadband connectivity being the railway line of the 21st Century.

1.3 Wide Effect of the Changing Nature of Work on the Economy, Society and the Environment

Charles Sturt University makes the following recommendations:

That, building on University Australia's 2010 work regarding Australia's future academic workforce, https://www.universitiesaustralia.edu.au/news/commissioned-studies/Academic-Workforce#.WnOZnkxuJjo, that the Australian Government, through COAG develop and implement, with the tertiary education and training sector, a national strategy for ensuring Australia maintains and

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assembles a technology-orientated academic workforce through the 21st Century.

1.4 Adequacy of Legislative Frameworks for the Future Nature of Work

That the Australian Government, work with industry, unions and the tertiary education and training sector to undertake a review of, develop and implement findings, of the Fair Work Act 2009 and related legislative instruments to ensure that Australia's industrial relations system is 21st Century technology fit-for-purpose to ensure international competitiveness for the future of work.

1.5 International Efforts – Capturing the Opportunities and Meeting the Challenges of the Future Workforce

Charles Sturt University makes the following recommendations:

That the Commonwealth Government commission suitable service providers to undertake a comprehensive review of international efforts aimed at capturing the opportunities and meeting the challenges of the future nature of work, with the report providing the basis for stakeholder consultation regarding the future of work and the nation's workforce.

1.6 Other Future Work and Workforce Considerations – In Regional, Rural and Remote Communities

Charles Sturt University makes the following recommendations:

That the recommendations detailed above regarding the future of work and the future workforce be developed and implemented with specific consideration given to the specific circumstances and unique needs of regional cities, rural towns and remote communities across Australia.

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2. Introduction

2.1 Background

The world of work is changing more rapidly than ever. The impact of technological and other changes, such as globalisation, is changing the future of work in Australia and the roles of workers in our economy and society.

In its recent discussion paper, *Future Proof: Protecting Australians Through Education and Skills*[1], the Business Council of Australia noted:

> *We are living in a time of massive technological disruption, and it is easy to understand why people are concerned about what this could mean for employment.*
>
> *Increasingly, it is not just routine clerical or repetitive factory tasks that are being automated but more skilled jobs too. Lawyers are already using text-mining techniques to read thousands of documents collected during discovery, for example.*
>
> *The concern that technology could kill jobs is far from new. In his famous 1930 essay, Economic Possibilities for our Grandchildren, the British economist John Maynard Keynes coined the term "technological unemployment" for situations when innovation destroyed more jobs than it created.*
>
> *In fact, history shows that technology-driven productivity can be, and has been, compatible with rising employment. In the United States, more than two-thirds of the years since 1929 have seen positive gains in productivity and employment. In France, a 2011 McKinsey study showed that over the previous 15 years, the internet had created 2.4 jobs for every job destroyed.*

The findings of similar studies and reports to that of the BCA by a range of organisations on the impact of technological change and how it is impacting the future of work in Australia and the roles of workers in our economy and society confer with the position of the Council, including:

- *Australia's Future Workforce*, Committee for Economic Development Australia (CEDA)[2].
- *Workforce of the Future, The Competing Forces Shaping 2030*, PWC[3].

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[1] *Future Proof: Protecting Australians Through Education and Skills.* Business Council of Australia. Melbourne. Australia. October 2017. See, http://www.bca.com.au/publications/future-proof-protecting-australians-through-education-and-skills.

[2] *Australia's Future Workforce.* Committee for Economic Development Australia (CEDA). June 2015. See, https://www.ceda.com.au/Research-and-policy/All-CEDA-research/Research-catalogue/Australia-s-future-workforce.

[3] *Workforce of the Future. The Competing Forces Shaping 2030*. PWC. See, https://www.pwc.com/gx/en/services/people-organisation/publications/workforce-of-the-future.html.

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- *The 21st Century Workplace*. The National Institute for Professional Practice. Wilkes University. USA[4].

Whilst the impact of technological change on work and workers is not new, what is evolving, however, and evolving at an ever-increasing rate, is the nature of job opportunities and employment available.

Over the last 25 years in the USA, more than one-third of new jobs created did not previously exist as America emerged from the early 1990s recession. Indeed, the challenge the US faced in lowering employment post the 1990s recession was compounded by the loss of lower-skill blue collar roles. These changes are causing the labour market to bifurcate more than even, with menial low-wage jobs on one end and high-skill, high-wage careers on the other. This increased workforce bifurcation is driving increased inequality throughout OECD countries[5].

Changing employment opportunities and emerging business challenges are driving the very nature of work, for example today, pilots actively steer aircraft for just three to seven minutes of any flight with autopilot guiding the rest of the journey. New research by the McKinsey Global Institute[6] suggests that while very few occupations will be fully replaced by machines, up to 45 percent of work activities could be automated using already-demonstrated technology.

These changes to the nature of work and the workforce itself will require entire business models and organisational processes to be transformed and jobs performed by people to be redefined, much like the bank teller's job was redefined with the advent of the ATM. These changes to models and processes are leading to menial low-wage jobs on one end and high-skill, high-wage careers on the other end of the workforce spectrum. Concurrently, employers, whether they be businesses, government or the NGO sector, report wide labour gaps in sectors ranging from health care to technology, and agonise about the future availability of workers with the necessary skills.

There is no question that the pervasive impact of technological change on the nature of work will mean that employees with science, technology, engineering and maths (STEM) backgrounds will be in particularly short supply[7]. Throughout this decade there has been a once in a century increase in the size of the global labour pool, however the 2020s are likely to be defined by a global battle for talent as organisations compete to hire people with the crucial - and rare - skills that they need[8]. Amongst these massive transformations, the opportunities and challenges

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[4] *The 21st Century Workplace*. The National Institute for Professional Practice. Wilkes University. USA. See, https://www.professionalpractice.org/about-us/skills_for_success_2/.

[5] Meeting of the OECD Council at Ministerial Level Paris, 23-24 May 2012. See, http://www.oecd.org/employment/50423364.pdf.

[6] *A Future That Works. Automation, Employment and Productivity.* McKinsey Global Institute. McKinsey & Co. January 2017. See, https://www.mckinsey.com/global-themes/digital-disruption/harnessing-automation-for-a-future-that-works.

[7] *Towards a 10-Year Plan for Science, Technology, Engineering and Mathematics (STEM) Education and Skills in Queensland. Discussion Paper*. See, http://education.qld.gov.au/projects/stemplan/docs/stem-discussion-paper.pdf.

[8] *Winning the Talent War in Local Markets by Staying Global.* McKinsey Global Institute. McKinsey & Co. January 2014. See, https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/Organization/PDFs/Winning_the_talent_war_in_local_markets_by_staying_global.ashx.

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for employers throughout the world are clear-cut. In the words of the Business Council of Australia[9]:

> *We should be preparing ourselves for the jobs of the future and preparing in a way that will offer people rewarding, continuous work, as industries change and adapt to external forces.*

A review of the literature, including the references detailed above, clearly demonstrates that many of the tomorrow's jobs will likely be in idea (or creative) intensive organisations such as education, training, media, health management and care pharmaceuticals, communications and information technology and finance. Manufacturing, where the traditional model has been capital intensive, is now becoming ideas-intensive as well, as we see in advanced technologies, such as three-dimensional printing of medical devices and solar panels. While not directly related to the future of work and the future workforce, technology has the potential to severely disrupt manufacturing business models by reducing barriers to entry and lowering capital intensities. Creative intensive sectors accounted for 17 percent of the profits generated by OECD companies in 2000, but that share is up to 31 percent today[10].

To this end, the Business Council of Australia has noted:

> *Such shifts have important repercussions for education systems. Foundational skills of computational thinking, design thinking and problem solving can be developed through a combination of humanities and STEM subjects. Where Australia has a gap at the moment in primary and pre-primary education is in the STEM side of the curriculum.*[11]
>
> *Within the STEM disciplines, especially the later years of schooling and university, there will need to be a new focus on workplace needs. In an era of big data, for example, we all need to make decisions on the basis of large sets of incomplete data with a lot of variance. So for future managers, a strong grasp of statistics will be important, more so even than a detailed knowledge of calculus.*[12]

The impact of technological and other related change on the future of work and workers in Australia will pose great challenges but also open immense opportunities for businesses, the NGOs sector and governments. The policy discussion and program ideas being led by the Select Committee on the Future of Work and Workers forms a crucial element of the discussion that must be had regarding the future of work in Australia and Australia's workforce.

2.2 Submission – Charles Sturt University

Charles Sturt University is pleased to provide a submission to the Australian Parliament's Senate established the Select Committee on the Future of Work and Workers to inquire and report on the impact of technological and other change on the future of work and workers in Australia. We have prepared a comprehensive

[9] Refer, Footnote 1, above.
[10] *The Knowledge Based Economy*. OECD. Paris. See, http://www.oecd.org/sti/sci-tech/1913021.pdf.
[11] Refer, Footnote 1, above.
[12] Refer, Footnote 1, above.

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and detailed submission containing commentary of our view and position of the future of work, the workforce and workers in Australia.

Drawing on our century-plus, second to none, hands-on experience in regional, rural and remote education, Charles Sturt University also proposes a range of recommendations that we believe would strengthen Australia's future work and workforce policy settings to ensure continued prosperity. Adopting our recommendations would particularly strengthen and grow the development regional, rural and remote workforce capability and capacity for the benefit of non-metropolitan Australians.

Our submission to the Select Committee on the Future of Work and Workers inquiry into the impact of technological and other change on the future of work and workers in Australia should be read in conjunction with recent submission from the University to a range of government inquires, including:

- School to Work Transition, see: http://www.csu.edu.au/__data/assets/pdf_file/0004/2853301/Submission-School-to-Work-Transition-Sub-64.pdf

- Rural, Regional and Remote Education, not published. Refer to proceedings of New South Wales Parliament's Standing Committee on State Development.

- Regional Development and Decentralisation, see: https://www.csu.edu.au/__data/assets/pdf_file/0010/2955907/Submission-Regional-Development-and-Decentralisation-Sub-120.pdf

- New South Wales: Strong, Smart and Connected Defence and Industry Strategy 2017, see: http://www.csu.edu.au/__data/assets/pdf_file/0007/2841784/Submission-0026-CSU-Defence-Industry-NSW.pdf

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3. Charles Sturt University

Charles Sturt University is Australia's largest regional university, with more than 39,000 students and approximately 2,100 FTE staff. Established in 1989, the University traces its origins to the formation of the Bathurst Experimental Farm and Wagga Wagga Experimental Farm in the 1890s. In one form or another, research, innovation and education has been integral to the University's character and mission for more than a century.

Charles Sturt University is a unique multi-campus institution with campuses at Albury-Wodonga, Bathurst, Canberra, Dubbo, Goulburn, Manly, Orange, Parramatta, Port Macquarie and Wagga Wagga, as well as various study centres located throughout regional and rural south-eastern Australia.

The University's commitment to the development and sustainability of rural and regional Australia is informed by the unique research focus undertaken, and the partnerships it has formed with each of its campus' local communities, local industry, and with the broader regions it serves.

Charles Sturt University offers a comprehensive suite of research and academic training programs that focus on addressing rural and regional labour market needs, growing regional economies, and preparing students for the jobs of the new economy through rural and regional Australia.

Particularly in health and medical related disciplines, Charles Sturt University seeks to address key training and equality of access issues across our rural and regional footprint, ensuring the critical supply of health professionals into local markets.

As one of Australia's largest online and distance education providers Charles Sturt University has been able to leverage its course profile and specialist expertise in education provision for the delivery of nationally available study programs. These programs support labour market skills development regardless of student location.

Our rural and regional focuses, as well as strength in online and distance education, position's Charles Sturt University as a leading institution in providing higher education opportunities to first-in-family applicants, mature-aged students, as well as those from disadvantaged backgrounds.

Increasing participation of Indigenous Australians in higher education has been a key focus area of the University's mission and ethos. Charles Sturt University consistently works in collaboration with Indigenous communities across our footprint to ensure access and develop links into the University. Our position as one of the top Australian universities for Indigenous participation is proof of our strong background in this regard.

The success of the University is demonstrated by its sector-leading performance in work-integrated learning, graduate employment and graduate incomes. Underpinning this success is the close links that the University has forged with industry, both regionally and nationally.

For example, the University is internationally recognised as a leader in work-integrated learning with students spending extended periods in employment with our industry partners as part of their degree learning and applying their knowledge in practice.

Research excellence, with a strong commitment to addressing the complex regional needs through innovation, has long been at the centre of Charles Sturt University's mission.

As evidenced by the recent Excellence in Research for Australia results (ERA 2015), Charles Sturt University is recognised internationally for competitive research strengths in agricultural science, horticultural production, food and wine sciences, crop and pasture production, veterinary science, animal production, education, curriculum and pedagogy, environmental science, applied ethics, philosophy, religious studies, criminology, nursing and marketing.

Charles Sturt University has a proud tradition of delivering high-quality research that creates new knowledge, benefits people's lives, enhances the profitability of regional industries and helps communities grow and flourish. Through its Higher Degree by Research programs, Charles Sturt University is training the next generation of researchers and professionals who use critical thinking and seek to influence the world for the better.

The recently announced AgriSciences Research and Business Park, to be located on the Wagga Wagga campus exemplifies our industry focus. The AgriSciences Research and Business Park will facilitate industry engagement and collaboration, economic growth, wealth creation, employment and skills development. Success will be evidenced by the recognition of Wagga Wagga as a world-standard centre for agricultural innovation, research and development, extension, education and training.

Today, Charles Sturt University continues a 100-year tradition of engagement and leadership with our local communities, of research and innovation in collaboration with industry, expansion in the educational opportunities offered to our diverse student body, and preparing students for employment markets emerging with the evolution of regional and the national economy.

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4. Submission to Senate Inquiry

Charles Sturt University is pleased to provide a submission to the Australian Parliament's Senate established the Select Committee on the Future of Work and Workers to inquire and report on the impact of technological and other change on the future of work and workers in Australia. We have prepared a comprehensive and detailed submission containing commentary of our view and position of the future of work, the workforce and workers in Australia.

Charles Sturt University also proposes a range of recommendations, that we believe would strengthen Australia's future work and workforce policy settings to ensure continued prosperity. Adopting our recommendations would particularly strengthen and grow the development of regional, rural and remote workforce capability and capacity for the benefit of non-metropolitan Australians.

Our position and recommendations address:

1. the future earnings, job security, employment status and working patterns of Australians;
2. the different impact of that change on Australians, particularly on regional Australians, depending on their demographic and geographic characteristics;
3. the wider effects of that change on inequality, the economy, government and society;
4. the adequacy of Australia's laws, including industrial relations laws and regulations, policies and institutions to prepare Australians for that change;
5. international efforts to address that change; and
6. other related matters and considerations in a regional, rural and remote context.

Charles Sturt University's submission has been prepared based on the Select Committee on the Future of Work and Workers' Terms of Reference which was obtained from the Australian Parliament's website at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Future_of_Work_and_Workers/FutureofWork/Terms_of_Reference]

4.1 The Future Nature of Work

(1) Position of Charles Sturt University

Advancements such as artificial intelligence and automation will result in the demise of some jobs and the creation of others, although the specific impacts are difficult to predict. There will be a portion of the workforce whose skills do not align with the requirements of future jobs. Employers are placing greater emphasis on soft skills and emotional intelligence, and agility will be increasingly important in response to emerging products, services and technologies, and new patterns of consumer behaviour.

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Education and training providers will need to adapt their courses to prepare graduates for the new roles, capabilities and attributes required by business, although the current paradigm in relation to graduate employment rates may not be valid in the gig economy. Workers will need to engage in lifelong learning in order to keep pace with technological developments and the changing nature jobs.

Charles Sturt University is committed to playing a major role in the preparedness of communities in regional Australia for the future nature of work, including through:

- playing a significant role in the sustainability of regional Australia through research and development, internationalisation and improving indigenous health and education;
- technological improvements that will provide a significant opportunity for the growth of regional Australia as industry no longer needs to be metro-centric;
- facilitating the significant changes required for the future nature of work, which are likely to include increased working from home or remote locations that can be beneficial but also has potential social consequences;
- fostering improvements in technology that can provide the opportunity for more globally engaged research;
- addressing the impacts of increased dependence on technology, including the significant risk of data security; and,
- increasing dependence on technology for improved health outcomes for remote populations, noting that this is dependent upon high speed reliable networking across the entire country.

(2) Charles Sturt University's Recommendations

Charles Sturt University makes the following recommendations:

- That technology literacy will be crucial to maximise participation in workforce of the future.
- That future workforce productivity will depend on individual talent that is creative, innovative, entrepreneurial and resilient.
- That individuals, as well as education and training providers, must be incentivised to undertake and provide science, technology, arts, engineering and maths (STEAM) studies, as well as globally-focused commercial studies, particularly international markets and finance.
- That Australia must aim to exceed the OECD average for public R&D expenditure in support of the recommendations above.

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- That building on initiatives, such as the National Science and Innovation Agenda (NISA), see http://www.innovation.gov.au and the Prosperity Through Innovation Statement of January 2018, see https://industry.gov.au/Innovation-and-Science-Australia/Pages/default.aspx, Australian governments must adopt a national technology transformation agenda, much like the leadership shown by the Victorian Government in the 1990s regarding multimedia.

4.2 Impact of the Changing Nature of Work

(1) Position of Charles Sturt University

Contingent workers comprise a growing proportion of the workforce, as the traditional permanent workforce is supplemented with casuals, contractors, freelancers and crowd-workers in the gig economy. This is driven partly by employers seeking flexibility and partly by workers (particularly millennials) seeking meaningful and flexible work, challenging experiences rather than long-term careers, and more collaborative and egalitarian workplaces.

There is a de-linking of work and the employment relationship, with fewer people in stable jobs and more working on a contingent basis. Online talent platforms have emerged that connect contingent workers to opportunities.

An increase in online work provides the potential for greater workforce participation and inclusion. Contingent work also allows people to opt in and out of work to suit their circumstances and may help employers to retain the skills of an aging workforce.

In the future employers will require talent management systems to effectively manage the diverse workforce described above, drive performance and keep their permanent and contingent workforce engaged.

Other considerations regarding the changing nature of work include:

- Social aspects where increased working from home (as noted above).
- Potential for increased employment in regional areas, as technology reduces the tyranny of distance and isolation.
- Greater integration of work activities across disciplines and locations.
- Better services across time zones – potential for employees to be situated world wide/global workforce.
- Potential for increased use of web-linked teaching and learning by universities and other education and training providers which could also potentially result in decreased population of staff living in regional areas (as services are delivered from global cities without the need for local infrastructure).

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(2) **Charles Sturt University's Recommendations**

Charles Sturt University makes the following recommendations:

- That building on the recommendations put forward above, governments and the private sector will hate to not only continue but increase investment in technology infrastructure, as "nice-to-have" infrastructure becomes "critical-utility" for future economic and social development, for example broadband connectivity being the railway line of the 21st Century.

4.3 Wide Effect of the Changing Nature of Work on the Economy, Society and the Environment

(1) **Position of Charles Sturt University**

Given higher education's status as a significant export industry and its impact on the economy, it is important to consider universities as employers.

Benchmarking conducted by the Australian Higher Education Industrial Association reveals a steady decline in the percentage of younger academic staff in the Australian higher education sector. There has been a decrease in academics under the age of 25, from 2.32 percent in 2012 to 1.54 percent in 2016, and the 25-29 age group has dropped from 8.95 percent in 2012 to 6.95 percent in 2016. This will have a significant effect on the availability of academic staff in coming decades.

This has been balanced by an increase in the percentage of mature academics remaining in the workforce, with an increase in the 60-64 age group from 6.83 percent in 2012 to 7.13 percent in 2016, and the 65+ group increasing from 2.6 percent in 2012 to 3.26 percent in 2016. Changing demographics will limit universities' capacity to offset the diminishing pipeline of new academics by retaining mature workers in the future, placing greater importance on attracting young people to academic jobs and on the attractiveness of the Australian higher education sector to the global academic workforce.

Academic workforce limitations will impact on the ability of the higher education sector to produce the graduates required for the Australian workforce.

(2) **Charles Sturt University's Recommendations**

Charles Sturt University makes the following recommendations:

- That, building on University Australia's 2010 work regarding Australia's future academic workforce, https://www.universitiesaustralia.edu.au/news/commissioned-studies/Academic-Workforce#.WnOZnkxuJjo, that the Australian Government, through COAG develop and implement, with the tertiary education and training sector, a national strategy for ensuring

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Australia maintains and assembles a technology-orientated academic workforce through the 21st Century.

4.4 Adequacy of Legislative Frameworks for the Future Nature of Work

(1) Position of Charles Sturt University

Employment laws and regulation have not kept pace with the impacts of new technologies on the nature of work and on traditional business models. While excessive regulatory burdens should be avoided, there is a need for regulation of online talent platforms.

There could be a blurring of the line between employment law and commercial law under some new business models. There is potential for traditional and new business models to be providing similar services but under different regulatory frameworks in terms of taxation, work health and safety, minimum wages, the National Employment Standards etc.

(2) Charles Sturt University's Recommendations

Charles Sturt University makes the following recommendations:

- That the Australian Government, work with industry, unions and the tertiary education and training sector to undertake a review of, develop and implement findings, of the Fair Work Act 2009 and related legislative instruments to ensure that Australia's industrial relations system is 21st Century technology fit-for-purpose to ensure international competitiveness for the future of work.

4.5 International Efforts – Capturing the Opportunities and Meeting the Challenges of the Future Workforce

(1) Position of Charles Sturt University

In developing policy settings and program interventions to ensure the effectiveness of Australia's future workforce and preparedness of Australian business and individuals for the future of work, that governments and stakeholders must examine and learn from international efforts aimed at capturing the opportunities and meeting the challenges of the future nature of work.

(2) Charles Sturt University's Recommendations

Charles Sturt University makes the following recommendations:

- That the Commonwealth Government commissioning suitable service providers to undertake a comprehensive review of international efforts aimed at capturing the opportunities and meeting the challenges of the future nature of work, with the report providing the basis for stakeholder consultation regarding the future of work and the nation's workforce.

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4.6 Other Future Work and Workforce Considerations – In Regional, Rural and Remote Communities

(1) Position of Charles Sturt University

Workplace technology to enable online/teleworking may be a mechanism to increase labour market participation. The option to work online from regional Australia is available and could be used to ease population and infrastructure pressures in urban and coastal areas. However, infrastructure in regional Australia is currently limiting this option.

Conversely, online working may allow employers to access skill sets not readily available in rural and regional Australia. This may be necessary in order for regional employers to operate in a global marketplace where there is significant competition for skills related to digitalisation and data science.

Charles Sturt University's experience suggests that professionals trained in regional Australia are more likely to go on to practice in regional areas, offsetting critical skill shortages. Incentives for school leavers to stay in the regions may be required to address the flow of future professionals to urban and coastal areas.

(2) Charles Sturt University's Recommendations

Charles Sturt University makes the following recommendations:

- That the recommendations detailed above regarding the future of work and the future workforce be developed and implemented with specific consideration given to the specific circumstances and unique needs of regional cities, rural towns and remote communities across Australia.

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5. Conclusion

The world of work is changing more rapidly than ever. The impact of technological and other changes, mostly enabled by technological change itself, such as globalisation, is changing the future of work in Australia and the roles of workers in our economy and society.

The findings of studies and reports by a range of organisations on the impact of technological change and how it is impacting the future of work in Australia and the roles of workers in our economy and society agree that whilst the impact of technological change on work and workers is not new, what is evolving, however, and evolving at an ever-increasing rate, is the nature of job opportunities and employment available.

Changing employment opportunities and emerging business challenges are driving the very nature of work, for example today, pilots actively steer aircraft for just three to seven minutes of any flight with autopilot guiding the rest of the journey. New research by the McKinsey Global Institute[13] suggests that while very few occupations will be fully replaced by machines, up to 45 percent of work activities could be automated using already-demonstrated technology.

These changes to the nature of work and the workforce itself will require entire business models and organisational processes to be transformed and jobs performed by people to be redefined, much like the bank teller's job was redefined with the advent of the ATM. These changes to models and processes are leading to menial low-wage jobs on one end and high-skill, high-wage careers on the other end of the workforce spectrum. Concurrently, employers, whether they be businesses, government or the NGO sector, report wide labour gaps in sectors ranging from health care to technology, and agonize about the future availability of workers with the necessary skills.

Tomorrow's jobs will likely be in idea (or creative) intensive organisations such as education, training, media, health management and care pharmaceuticals, communications and information technology and finance. Manufacturing, where the traditional model has been capital intensive, is now becoming ideas-intensive as well, as we see in advanced technologies, such as three-dimensional printing of medical devices and solar panels. While not directly related to the future of work and the future workforce, technology has the potential to severely disrupt manufacturing business models by reducing barriers to entry and lowering capital intensities.

The impact of technological and other related change on the future of work and workers in Australia will pose great challenges but also open immense opportunities for businesses, the NGOs sector and governments. The policy discussion and program ideas being led by the Select Committee on the Future of Work and Workers forms a crucial element of the discussion that must be had regarding the future of work in Australia and Australia's workforce.

We have provided extensive commentary and opinion, based on an extensive review of Australian and international literature, as well as our own comprehensive

[13] *A Future That Works. Automation, Employment and Productivity.* McKinsey Global Institute. McKinsey & Co. January 2017. See, https://www.mckinsey.com/global-themes/digital-disruption/harnessing-automation-for-a-future-that-works.

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research across regional, rural and remote south-eastern Australia regarding the impact of technological and other change on the future of work and workers. Our commentary and opinion addresses:

- the future earnings, job security, employment status and working patterns of Australians;
- the different impact of that change on Australians, particularly on regional Australians, depending on their demographic and geographic characteristics;
- the wider effects of that change on inequality, the economy, government and society;
- the adequacy of Australia's laws, including industrial relations laws and regulations, policies and institutions to prepare Australians for that change;
- international efforts to address that change; and,
- other related matters and considerations in a regional, rural and remote context.

Furthermore, Charles Sturt University's submission to the Committee's Inquiry provides an extensive and detailed range of recommendations that we believe would greatly strengthen Australia's future regional, rural and remote workforce for better economic, social and environmental outcomes for students and our communities across New South Wales and Victoria, as well as the rest of non-metropolitan Australia. Our recommendations include:

- That:
    - Technology literacy will be crucial to maximise participation in workforce of the future.
    - Future workforce productivity will depend on individual talent that is creative, innovative, entrepreneurial and resilient.
    - Individuals, as well as education and training providers, must be incentivised to undertake and provide science, technology, arts, engineering and maths (STEAM) studies, as well as globally-focused commercial studies, particularly international markets and finance.
    - Australia must aim to exceed the OECD average for public R&D expenditure in support of the recommendations above.
    - Building on initiatives, such as the National Science and Innovation Agenda and the Prosperity Through Innovation Statement of January 2018, Australian governments must adopt a national technology transformation agenda, much like the leadership shown by the Victorian Government in the 1990s regarding multimedia.
- That building on the recommendations put forward above, governments and the private sector will have to not only continue but increase investment in technology infrastructure, as "nice-to-have" infrastructure becomes "critical-

utility" for future economic and social development, for example broadband connectivity being the railway line of the 21st Century.

- That, building on University Australia's 2010 work regarding Australia's future academic workforce, that the Australian Government, through COAG develop and implement, with the tertiary education and training sector, a national strategy for ensuring Australia maintains and assembles a technology-orientated academic workforce through the 21st Century.

- That the Australian Government, work with industry, unions and the tertiary education and training sector to undertake a review of, develop and implement findings, of the Fair Work Act 2009 and related legislative instruments to ensure that Australia's industrial relations system is 21st Century technology fit-for-purpose to ensure international competitiveness for the future of work.

- That the Commonwealth Government commissioning suitable service providers to undertake a comprehensive review of international efforts aimed at capturing the opportunities and meeting the challenges of the future nature of work, with the report providing the basis for stakeholder consultation regarding the future of work and the nation's workforce.

- That the recommendations detailed above regarding the future of work and the future workforce be developed and implemented with specific consideration given to the specific circumstances and unique needs of regional cities, rural towns and remote communities across Australia.