

Trends

September 2019

A bulletin of
economic developments
in South Australia

Future of work

The role that technology will have on our workforce



Chief Executive's Foreword

Don't fear technology, fear a lack of skills



Welcome to the latest edition of BankSA's economic bulletin, *Trends*, compiled in conjunction with Deloitte Access Economics.

In this edition, we look at the future of work in South Australia, including the impact of technology on our jobs, the changing employment landscape and how South Australia can lead the nation in industries where we have a competitive advantage.

Fears that new technologies will lead to mass unemployment have persisted for decades, but so too has employment growth.

This edition of *Trends* examines the concept of technology as a substitute for people, with a focus on the future of employment in South Australia and the opportunities that exist within our key growth industries.

It is clear that South Australian businesses need to increase the level of technology-based skills training they provide to employees or risk being left behind in the economy of the future.

South Australia, like the rest of the nation and largely the world, has seen how technology is bringing about radical and

unprecedented change in the labour force. But that's only part of the story.

We only need to look at the most recent falls in employment both locally and internationally to see technology isn't to blame.

In the United States the largest fall in employment in recent history was a result of the Global Financial Crisis. In Australia, it was the early 90s recession which saw unemployment hit record lows, with 139,000 jobs lost in manufacturing alone. When computers hit the market and online shopping became commonplace, unemployment levels remained unchanged.

Technology is clearly changing the way we work and the skills we need to work,

but it's creating just as many jobs as it's replacing. But are we fully prepared for what will be required from our workforce of the future? And do we really understand the industries that will see the greatest growth and losses over the next decade and beyond?

Australia has seen more than 1.8 million jobs created in the past decade – during a time that most would agree has been a period of rapid technological change. While we've moved away from manual 'routine' work, we've replaced it with 'non-routine' cognitive work specifically in services sectors. While robots take over repetitive and largely mundane tasks, more challenging and interesting jobs are being created for humans.

Take manufacturing, for example. While

we've seen a sharp drop in manufacturing jobs in recent times – we've also seen significant growth in employment opportunities in healthcare to cater for our ageing population and increasing research needs.

In fact, healthcare, education and professional services are likely to benefit most from new technology in the years to come, adding more than 60,000 jobs in South Australia by 2030.

There are plenty of other opportunities for South Australia to embrace technology and reap the economic rewards but we do need to better prepare our current and future workforce for the changes that lie ahead.

The South Australian Government has outlined a plan for 3% economic growth over the next 5–10 years. It will be vital that we focus on the sectors that are specific to South Australia's competitive advantage – defence; health and medical industries; professional and information technology services; and creative industries – if we are to achieve this.

Interestingly, people – not technology – are central to driving value in each of these industries, making it important that we address potential skills shortages that will result from their growth.

Generally, it is estimated that at least 75% of new jobs in the future will demand some ability in science, technology, engineering and maths (or STEM as they are commonly referred). We can see this in our own state's economic future as it will be emerging industries – highly reliant on technology and STEM skills – where much of the incremental growth will come from.

An additional challenge comes from the fact that only 30% of STEM roles are occupied by women and just 16% of those are qualified. If South Australia is going to meet the demand for STEM skills and achieve the economic advantages that will follow, we must also be deliberate in opening up opportunities that give women the confidence to pursue them.

Deloitte Access Economics has estimated that this year alone there will be 23 million skill shortages across the Australian economy. This doesn't mean we're short of people for the job, it means we're short of people with the right skills for the job. It's the equivalent of saying that every employee in Australia is, on average,

missing two of the critical skills that they need to meet employers' expectations.

It's a statistic that reinforces the importance of skilled migration and population growth in our state, which has steadily declined and now trails the other states. It also reaffirms the role technology and innovation precincts, like Adelaide's Lot Fourteen, will play in retaining skilled South Australians while attracting new industry and business to fuel growth in our economy.

The recent announcement of a Living Lab at Lot Fourteen with the Massachusetts Institute of Technology (MIT) will see big data used to gain insights and inform decision making on key issues such as population growth, jobs creation, transport network efficiency, investment and tourism.

BankSA is proud to be the Principal Partner of the Living Lab, which will be the first of its kind in Australia. We're looking at new ways to collaborate and take action to back our state.

However, if we fail to invest in upskilling to meet these new ways of working, skills shortages will be most prolific in industries that are key to driving our state's growth.

At the end of the day, technology isn't a substitute for people.

But we must better prepare workers from declining industries to successfully transfer their skills. This will require greater investment in training and upskilling of the current workforce as roles evolve, and reviewing the role the education system plays in future skill development to ensure the state's longer-term, evolving skills needs are met.

As *Trends* highlights, South Australians have nothing to fear from technological change – but we do need to be prepared and we must all be open to extending and transferring our skills to broaden our future growth prospects.



Nick Reade
Chief Executive, BankSA

1.8M

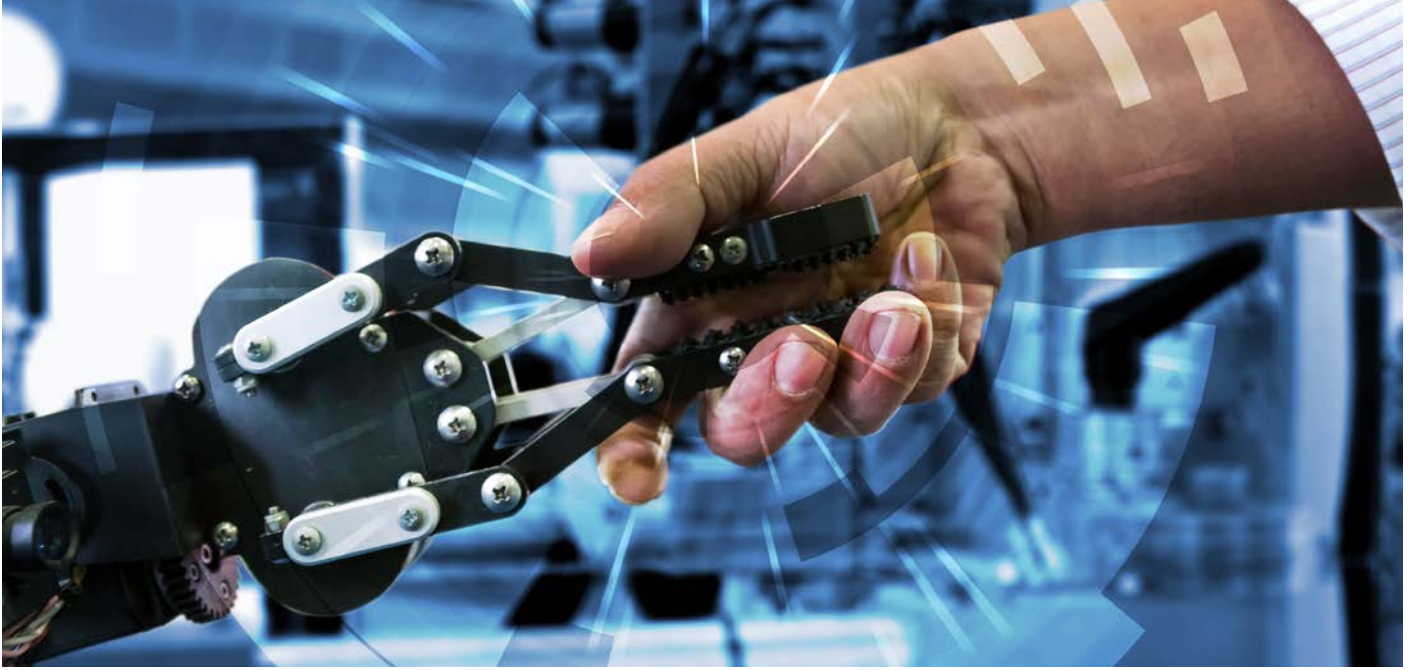
The number of jobs created in Australia over the past decade, despite rapid technological change.

25,000

The number of jobs created in non-routine, cognitive work in South Australia in the past decade.

2.3

The number of missing skills per employee forecast across South Australia's key growth industries by 2030.



The future of work

“If you feared that new technologies would lead to mass unemployment ... it just isn’t happening.”

- Chris Richardson, Partner, Deloitte Access Economics, 2019

“Throughout the past 100 years it’s been more a case of technology remaining the loyal friend not foe of the worker.”

- Karen Chester, Deputy Chair of Australian Securities & Investments Commission

“Artificial intelligence and robotisation have the potential to increase the productivity of the economy and, in principle, that could make everybody better off.” - Joseph Stiglitz

Commentary about the impact of technology on our workforce has been largely negative. However this is masking the positive story that the facts tell us.

Our analysis looks at the numbers to:

- Understand the real impacts of technology on our jobs;
- Think about South Australia’s future employment landscape; and
- Figure out how to get there in a way

that can put South Australia ahead of the pack.

The facts tell us that there are plenty of opportunities for South Australia to embrace technology and reap the economic rewards. But sitting back and waiting for technology to spark growth isn’t enough.

We can also reap a strong economic dividend by:

- Focusing on industries where South Australia has a competitive advantage; and
- Ensuring our training and education systems, and migration strategies, foster skills in alignment with the skill needs of the new economy.

Myth-busting and the way forward

Will robots take all our jobs? The short answer is no.

The rise of automation and increasingly sophisticated artificial intelligences are causing a lot of anxiety about the future of work. But we shouldn't be scared. Technology is not a substitute for people.

Fears that technology will lead to mass unemployment have persisted for decades, but so has employment growth (most of the time).

In recent history, the largest fall in US employment was caused by the Global Financial Crisis, and in Australia it was the early-1990s recession. But what happened when personal computers hit the market, or when online shopping became widespread? There was no corresponding fall in employment.

In fact, new technologies generally create as many (if not more) jobs than they kill. It's just that the ones that they kill are easily spotted, while the ones they create are often hiding in plain sight.

In the Australian economy, 1.8 million jobs have been created over the past decade – a period of rapid technological change.

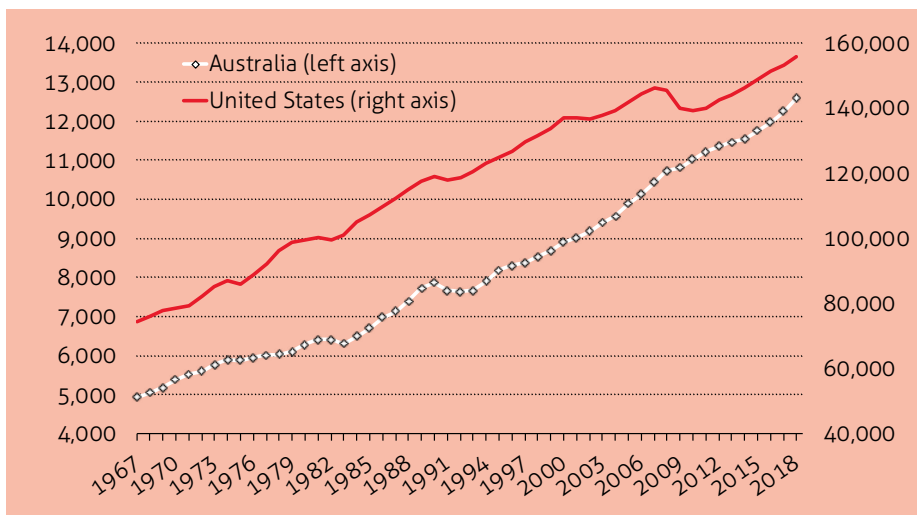
While in the US economy, a massive 10.4 million jobs have been created over the past decade. This is over the same period of time that technology giants like Apple, Samsung and Amazon have joined the ranks of the top 20 largest companies in the world.

While more jobs are created by technology than destroyed, those created are often in different industries. For example, while manufacturing's share of South Australian employment has dropped sharply, healthcare's share has grown.

And workers in many declining industries like manufacturing tend to have skill sets that are applicable elsewhere, even when not immediately obvious.

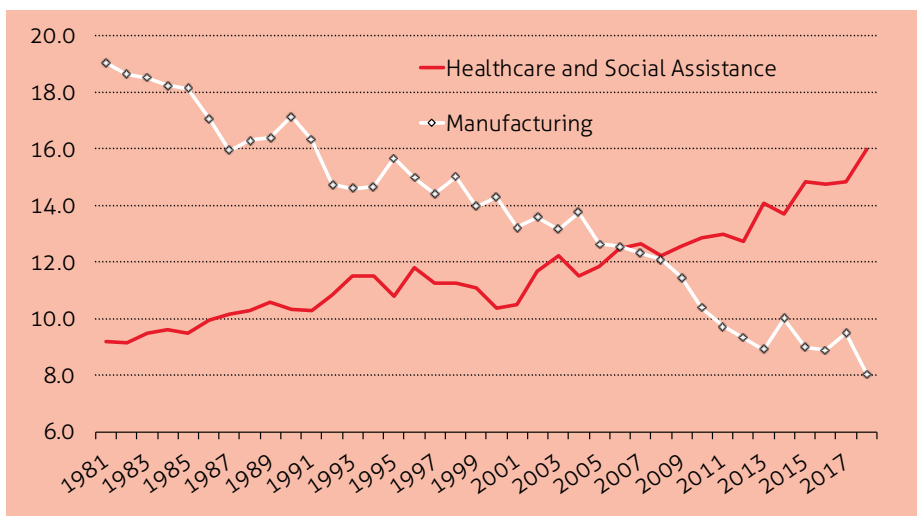
While the end of Australia's car manufacturing industry has had negative consequences for some, it was nowhere near as disastrous as had been predicted. Many automotive workers successfully transitioned into roles with small, high-tech firms like

CHART 1
EMPLOYMENT - 000's



Source: OECD

CHART 2
INDUSTRY SHARES OF SOUTH AUSTRALIAN EMPLOYMENT - %



Source: Australian Bureau of Statistics.

Axiom Precision Manufacturing. Once a key supplier in Australia's automotive industry, Axiom is now working on some of the largest defence projects in the state and has successfully upskilled/re-trained its current workforce in advanced manufacturing to be ready for upcoming defence projects.

Car manufacturing workers possess many skills and qualifications that apply to other industries such as food manufacturing, healthcare, warehousing and logistics, but this transferability of

skills was poorly understood by workers.¹ People tend to perceive their skills as being highly occupational-specific, even when that's not the case. This means that transferable skills are often understated in job applications and interviews, even though they are highly valuable.

If you define yourself as a car manufacturing worker when there's no car manufacturing industry, then you are in trouble. But if you define yourself as a worker with skills in, for example, design, problem solving and collaboration, then

¹ Snell, Gekara and Gratt, *The Occupational Mobility and Skills Transferability of Australian Auto Industry Employees* (2016), <<https://whatsnext.jobs.gov.au/sites/whatsnext/files/2017/04/The%20Occupational%20Mobility%20and%20Skills%20Transferability%20of%20Australian%20Auto%20Industry%20Employees-accessible.pdf>>.

you have options because those skill sets are valuable elsewhere.

To make the most of the changes that the future is bringing, South Australia needs to ensure that people in the jobs that are susceptible to automation can position themselves to take on new roles, and make sure that the emerging jobs can be filled by people with the right skills.

But how?

- First, the types of jobs that are declining and those that are growing need to be identified so we know where to focus. This requires understanding of how technology will impact different types of work.
- Then we need to understand the skills needed for the jobs of the future, and ensure our education, training and recruitment practices are supporting and targeting these skills.

The rest of this article aims to provide this information, while also focusing on how South Australia can use this as a competitive advantage.

Technology and the work we do

Technology is affecting the way we work in many different ways. It can change how we perform a task, or can even change the tasks that are needed by complementing and automating work. Technology also affects what consumers want and how they want it, driving demand for some industries and diverting it away from others.

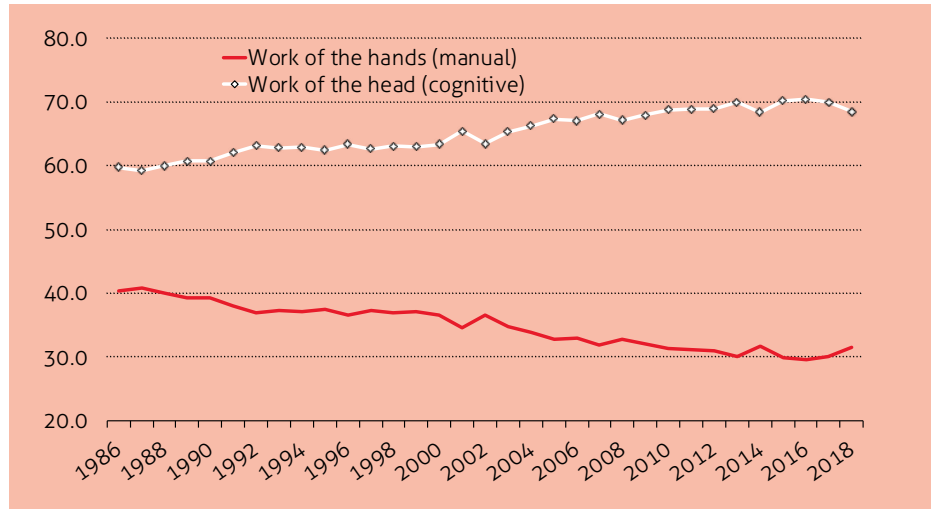
These impacts of technology have manifested in two major trends:

1. A shift away from work of the hands (manual work) towards work of the head (cognitive work)

Thought-based jobs have been taking over from manual work for decades and this shift is continuing.

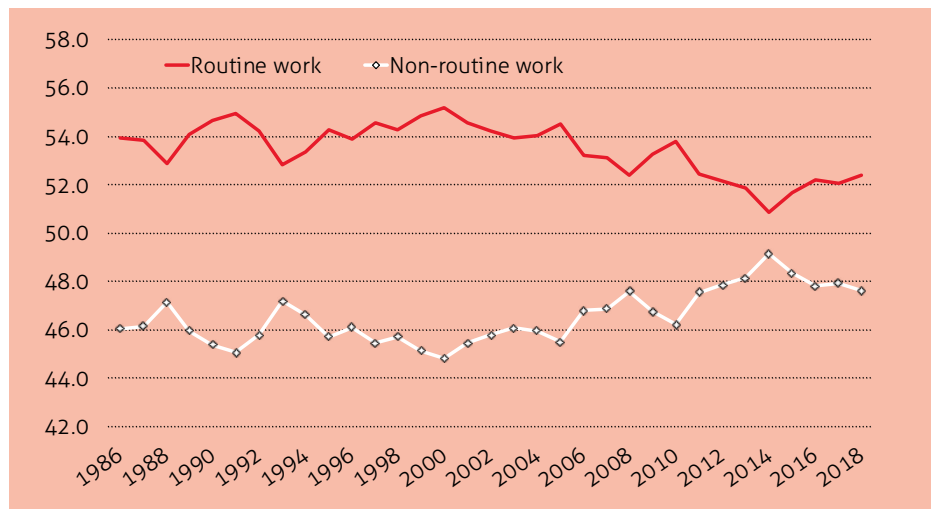
Physical machines of all sorts have been adopted across countless production lines and work sites, while computer technologies have enabled fields like finance, science and information technology to rapidly evolve and expand.

CHART 3
HANDS AND HEADS SHARE OF EMPLOYMENT IN SOUTH AUSTRALIA - %



Source: Deloitte Access Economics, Australian Bureau of Statistics.

CHART 4
ROUTINE AND NON-ROUTINE SHARE OF EMPLOYMENT IN SOUTH AUSTRALIA - %



Source: Deloitte Access Economics, Australian Bureau of Statistics.

Work of the head has grown from 60% to 70% of South Australian employment over the past 30 years. While the shift away from more manual work of the hands has stabilised, it will likely continue into the future.

2. A shift away from routine work towards non-routine work

As technology moves beyond the physical realm, routine tasks are being rapidly automated and the workforce is shifting towards doing non-routine work.

Work of the head and work of the hands

can both be automated if they are well understood and repetitive. But non-routine jobs are difficult (or impossible) to automate because the actions or processes involved are not repetitive enough to be codified. Non-routine jobs are, therefore, often complemented rather than replaced by technology.

Chart 4 shows the general upward movement in non-routine work as a share of all work, although it is not a uniform trend from year to year.

As digital technologies develop further and artificial intelligence becomes

capable of completing more complex tasks, non-routine work will eventually take over from routine.

These employment trends brought on by technology have combined to see non-routine, cognitive work of the head be the largest single source of employment growth over the past decade, adding almost 25,000 jobs in South Australia.

Looking to the future, the transition of the South Australian workforce from hands to heads and from routine to non-routine jobs will likely continue.

This will have implications to retrain and upskill segments of the workforce as the transition continues. Non-routine work of the head will likely continue to grow at the fastest pace, while at the other end of the spectrum, routine work of the hands is expected to decline.

South Australia's future employment landscape

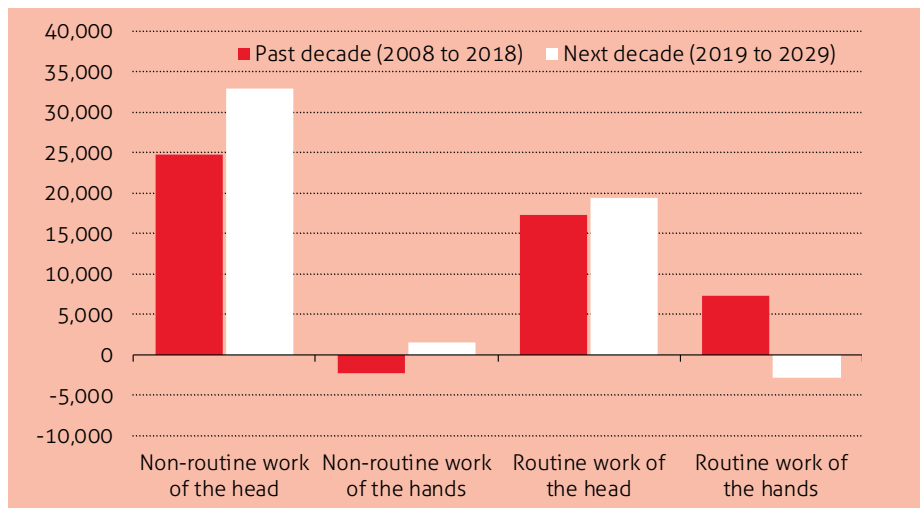
So now we know how technology impacts different kinds of work. But what does this mean for the employment landscape in South Australia?

Healthcare, education and professional services will be complemented and supported the most by technology, adding nearly 59,000 jobs in combination to South Australia by 2030. This is more than double the amount of jobs forecast to be lost from the agriculture, retail and manufacturing industries combined.

South Australia is unique in its demographic, geographic and existing industry landscape. All of these factors will impact the future of work in the state along with technological advancements. For example, a quickly ageing population will contribute to South Australia's healthcare industry, while established defence industry precincts will contribute to advancements in engineering and other disciplines.

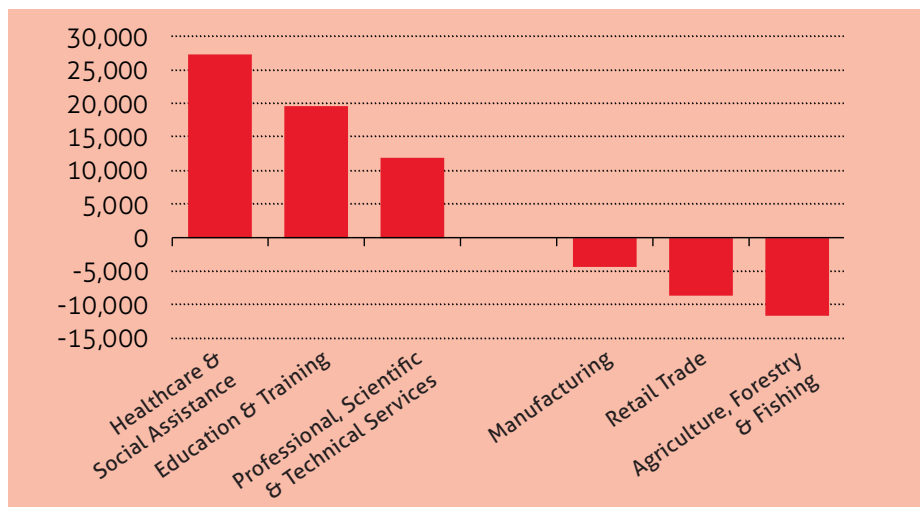
Demographics, geography and existing industries also affect the sectors in which South Australia has a comparative advantage. These are the areas where South Australia is uniquely placed to drive innovation and growth. Focusing on the

CHART 5
EMPLOYMENT GROWTH IN SOUTH AUSTRALIA BY TYPE OF WORK - number of people, history & forecast



Source: Deloitte Access Economics, Australian Bureau of Statistics.

CHART 6
FORECAST TOP 3 & BOTTOM 3 INDUSTRIES FOR EMPLOYMENT GROWTH IN SOUTH AUSTRALIA - number of people, 2018 to 2030



Source: Deloitte Access Economics.

state's areas of comparative advantage will provide the state with the greatest opportunity to grow.

South Australia's comparative advantage

In *Make it Adelaide*, Deloitte Access Economics identified eight key sectors for South Australia's future growth.² These sectors consider technological change as well as demographics and existing industry settings.

Four of the eight sectors are specific to South Australia's competitive advantages, building on the state's strengths and

growing services sector jobs:

- Defence industries
- Health and medical industries
- Professional and information technology services
- Creative industries

South Australia's advantage in the **defence industry** is clear, being home to the only state-based defence agency in Australia, DefenceSA, along with three large defence industry precincts.³ More than 3,500 people are currently employed

² Deloitte, *Shaping Future Cities - Make it Adelaide* (2017).
³ DefenceSA, *Precincts* (2019) <<http://www.defencesa.com/precincts>>.



in the defence industry in South Australia, and the state's share of national defence employment has been rising.

Along with obvious physical and manual skills, the defence industry relies on non-routine cognitive skills. These include interpersonal skills like guiding, directing, motivating, developing and coaching others, as well as analytical skills like analysing data and information, and thinking creatively.

Analytical skills will be increasingly important in defence as new technologies are developed for and by the industry. While South Australia's defence industry precincts develop and use new technologies, they will also have a major opportunity to foster the skills required to support the industry.

Analytical skills are also crucial in the **health and medical sector**. This is particularly the case for research, which is the part of the sector that holds the greatest potential for South Australia.

Adelaide is home to Adelaide BioMed City, one of the largest health and life sciences clusters in the Southern Hemisphere.⁴

Similarly to defence precincts in the defence industry, clusters like Adelaide BioMed City can play a large role both in the development of new technologies and the fostering of relevant skills for the health and medical sector. The unique location of the Adelaide BioMed City next to South Australia's redeveloped convention centre has also helped to position Adelaide as a medical conference capital.

Currently, the largest concentration of health sector workers in South Australia is in hospitals and residential care services. But we shouldn't overlook medical services such as pathology and diagnostic imaging operators, which will help support growth throughout the entire health sector. For this sub-sector to flourish, a workforce that is equipped with the right technical and technological skills will be required.

While research and technology will be a key growth area for the health sector, other parts of the sector are also growing rapidly as health care needs from an ageing population increase. Growth in the

broader health sector will rely heavily on interpersonal and other uniquely human skills.

Uniquely human skills such as creativity are also crucial for **creative industries**. South Australia has strong growth potential in this sector and is commonly known as the home to the Fringe, the second largest festival of its kind in the world, as well as WOMAdelaide, the Adelaide Festival and Adelaide Writer's Week. Importantly, the state's growth potential in this sector is not just limited to festivals, but also encompasses the growing film, media and production industries. In fact, the South Australian screen industry contributed a record \$119.5 million to the state's economy in the 2017-18 financial year.⁵

Growth in creative industries can be used to support growth in other sectors such as tourism, but for creative industries to thrive, more than just creative skills will be required. Planning, coordination and communication will also underpin the success of this industry, particularly when it comes to large scale creative events.

While South Australia is widely recognised for its creative industry and is also considered a hub for defence and healthcare, that is not necessarily the case for **professional and information technology services**. But this industry is of significant value to the economy – and will be especially so going forward, as the economy transitions to one that is services-focused.

Over the past 20 years, jobs in professional services in South Australia increased by 51%, compared to just 29% across all sectors. To ensure further growth in this sector, clustering will be increasingly important due to their positive impacts on productivity.

Retention of people with financial, information technology and other professional services skills and experience, will also be a key factor in growing this industry in South Australia.

The remaining four sectors identified as key to South Australia's future growth are industries where Australia as a whole has a significant advantage, and global growth is strong:

- International education
- Tourism
- Energy and resources
- Agribusiness

International education is South Australia's largest services export and has experienced strong global growth, with the number of outbound tertiary students doubling over a decade. While international students do attend other levels of education, more than half attend higher education. Hence, maintaining the quality of our education system and keeping pace with international education standards is critical in supporting growth in this sector.

South Australia's education workforce is currently more highly concentrated in school education, and less concentrated in tertiary education than the national average. A greater concentration of workers and skills in tertiary education may be required to sufficiently support

growth in international education.

Other international visitors have helped support South Australia's **tourism sector**. However, the state is more popular among domestic tourists, bringing more than three times the amount of spending than international tourists in 2018.⁶

Another area where South Australian employment has skyrocketed is in electricity market operation and on-selling of electricity. This sector has grown from providing close to zero jobs in 2015, to around 8,000 in 2019.⁷

"International education is South Australia's largest services export and has experienced strong global growth, with the number of outbound tertiary students doubling over a decade."

This is likely a by-product of the state's strength in the **energy and resources sector**. While having natural advantages in traditional sources of energy generation, South Australia is also leading the nation in renewable energy commercialisation.

To continue the state's dominance in this field, and leverage both domestic and global opportunities, further research and technological development will be key. This will only be possible with a workforce equipped with the relevant technical capabilities.

The final of the eight industries identified as key to South Australia's future growth is **agribusiness**. Unlike most of the state's other key growth sectors, the agricultural industry is not expected to be a major source of employment in the future. However, there are still some growth opportunities in the industry.

Consumer preferences are driving a trend towards manufactured food and beverages, which has emerged as South Australia's largest manufacturing industry, following the closure of automotive manufacturing.

Food processing is an area where skills accumulated by workers in other fields can be applied. It is also a sector that can be used to support growth throughout its supply chain, such as for farmers and growers.

While agribusiness is the last of the eight listed growth industries for South Australia, there is one remaining industry of comparative advantage that has not been previously identified: the **space industry**.

Australia's space agency was founded just one year ago (July 2018), and is headquartered in Adelaide. The space agency will be a hub for research and innovation in the field of science and technology, providing South Australia with an opportunity to lead the nation in this relatively young field and participate in this \$400 billion global industry.

As with most of the other industries discussed here, attracting, developing and retaining people with the relevant skills will be key to the space industry's success in South Australia.

What skills will be needed?

Occupations and industries evolve quickly, and people move between them. According to LinkedIn, many of the fastest growing jobs – like machine learning engineers or big data developers – didn't even exist five years ago.⁸

So how do we prepare for the future workforce landscape when it is changing so quickly?

We focus on skills. As technology, preferences and demography evolve, the right set of core skills will mean that workers can add value to a range of tasks, occupations and industries.

As with occupations and industries, skills can also be defined as being hands-related (manual) or heads-related

⁶ Tourism Research Australia, *International Visitor Survey (2019)*.

⁷ ABS, 6291.0.55.003 – *Labour Force, Australia, Detailed, Quarterly (Feb 2019)*.

⁸ <https://business.linkedin.com/talent-solutions/blog/trends-and-research/2018/linkedin-emerging-jobs-report-2018>

(cognitive). Manual skills of the hands include manual dexterity and spatial orientation, while cognitive skills of the head are more analytical, e.g. analysing data or interpreting information provided by others.

The continued shift away from work of the hands towards work of the head will require a workforce of people equipped with analytical skills. Analytical skills will be key to both developing new technologies and creating innovative uses for them.

This will be particularly important to support many of South Australia's future growth industries which are highly analytical and dependent on technologies such as defence, health and medical research, professional and information technology services, education and energy and resources.

But as the shift away from work of the hands towards work of the head continues, the next stage will be a move towards work of the heart. Humans are still better at being human. Interacting with others, being creative, understanding and reacting to emotions. These are all inherently human skills, and focusing on these will bring the greatest benefits in the long run.

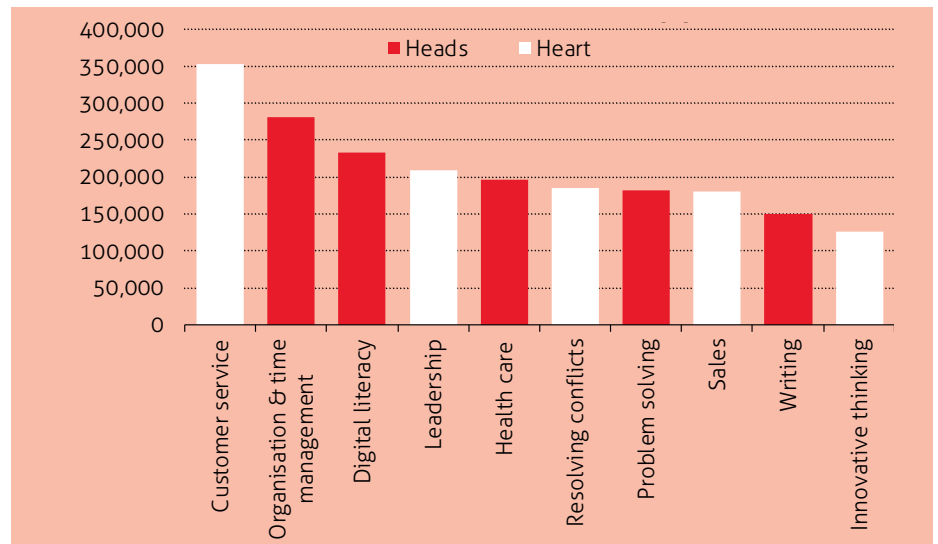
And interpersonal skills of the heart can also support growth in analytical skills of the head, by enabling people to coach, develop and inspire others.

Research shows that many skills of the head, and particularly skills of the heart are in short supply in South Australia.⁹

Among the most critical skills shortages are customer service (heart), organisation and time management (head), digital literacy (head) and leadership (heart).

Can you imagine a tourism industry without customer service, a defence industry without leadership and organisation, or an information technology industry without digital literacy? These skills with the greatest shortages are among the most important to South Australia's future growth industries.

CHART 7
TOP 10 SKILLS SHORTAGES IN SOUTH AUSTRALIA - NUMBER OF PEOPLE, 2019



Source: Australian Bureau of Statistics.

By 2030, it is forecast that the healthcare, education and public (including defence) sectors will have the largest skills shortages in South Australia, at an average of 2.3 missing skills or more per employee.¹⁰

A lack of skills, particularly in South Australia's key growth industries could stand in the way of the state achieving its full growth potential. So what can we do about it?

Ensuring South Australia has the right skills

A number of key actions can be taken from the short-term through to the long-term to mitigate skills shortages and ensure South Australia has the skills required to support its economic growth:

- In the short-term: Invest in training and up-skilling;
- In the medium-term: Attract skilled migrants (both international and interstate); attracting South Australians interstate to return to live and work; and retain skilled locals;
- In the long-term: Incorporate skills of the head and the heart into all levels of the education system.

Businesses in Australia spend \$7 billion per year recruiting candidates with the

skills they need. But the skills that each business needs are changing rapidly, particularly as technologies evolve. This makes recruitment an expensive solution to filling shortages, particularly when it doesn't always work out.

The cost of hiring the wrong person (whether that be because they lack the skills or aren't a good cultural fit) can be significant – the cost of replacing a bad hire six months into the job is estimated at two and a half times that person's salary.¹¹

So instead of spending on recruitment to fill skills needs, why not invest in upskilling the existing workforce? This allows businesses to build the capabilities they need, when they need them, rather than buy them.

Australian businesses currently spend \$4 billion on workforce training each year, much less than the \$7 billion spent on recruitment. One of the best ways to avoid skills shortages would be to flip those numbers and start spending on training instead of recruitment, because as skills shortages worsen, the cost of recruitment will only grow.

While the balance between workforce training and recruitment needs a shift, some recruitment will still be necessary,

10 9 & 10 Deloitte, *The path to prosperity: Why the future of work is human* (2019)

11 Yager, F. *The cost of bad hiring decisions runs high* (2017) <<http://insights.dice.com/report/the-cost-of-bad-hiring-decisions/>>



particularly as South Australia dives into the cutting edge of defence, health and space.

But South Australia has faced difficulties in attracting workers to the city and regions. The state's current share of international and domestic migration flows are well below its share of the Australian population.

While skilled migration would help boost South Australia's economic growth, migrants are more likely to come to the state when economic conditions are already strong, creating a chicken-and-egg issue.

And adding a further challenge, despite the availability of jobs in regional centres and the willingness for employers to pay workers more, money and opportunity are often still not enough to encourage workers to move to regional areas.¹²

Quality education and health services, employment opportunities for spouses or partners, and social amenity are all key to attracting skilled workers to South Australia. The state already has a high liveability ranking, supported by its relaxed and affordable lifestyle, ease of travel, abundance of cultural and leisure activities, education and infrastructure.

The state boasts one of the shortest commute times and lowest residential property prices of all mainland capital cities, with universities ranked within the top in the world. This suggests that more proactive action needs to be taken to successfully retain and attract skilled workers.

Supporting and developing industry and research hubs is one key pathway to attracting and retaining skilled workers, while also encouraging the upskilling of the existing workforce.

South Australia is already home to major hubs for defence and health, and a

¹² Deloitte, *Shaping Future Cities – Make it Adelaide* (2017).

creation and innovation neighbourhood, Lot Fourteen.¹³ There is immense value in bringing people, ideas and technologies together through hubs like these, stimulating ideas and innovation.

Both current and potential future hubs can be used not just to inspire research and innovation, but also to proactively meet South Australia's skills needs. Research and industry hubs can be used as a major selling point for attracting and retaining skilled workers. They can also be used as centres for training and education.

However, the traditional education system also has a major role to play in ensuring South Australia's long-term skills needs are met.

This does not necessarily mean changing the school curriculum every time a new technological development occurs. But curriculums do need to change to keep up with the evolving landscape that they are preparing students for.

Incorporating both skills of the head and of the heart into our schooling, vocational training and tertiary education institutions will give South Australia a head start in meeting future skills needs. This means creating adaptable education environments that don't teach people a long list of static facts to remember, but instead equip them with the ability to understand and embrace the changes happening around them, and have the ability to adapt and learn as they go. In order to create adaptable education environments, broad and deep engagement across the sector involving teachers and parents would be necessary. For example, teachers would be making use of a wide variety of learning tools to promote engagement of students and critical thinking.

An aside on smart cities

Deloitte defines a smart city as one which comprehensively integrates digital technologies into its design in order to improve infrastructure and systems, such as using sensors to improve transport efficiencies, or predictive analysis to target criminal activity in at-risk areas.¹⁴ Investing in smart cities therefore increases the quality of living for residents and supports sustainable economic growth.¹⁵

Some of the earliest smart cities programs included IBM's 'Smarter Cities' initiative in 2011, using heat dissipation pattern sensing and analytics in Glasgow to identify the potential to redirect heat from industrial facilities to heat homes – addressing fuel poverty and improving resource allocation in the city.¹⁶

More recent technology developments such as the Internet of Things have

facilitated ambitious changes, such as reducing crime and improving traffic management through an integrated and comprehensive system of data collectors and sensors in Singapore.¹⁷

Smart cities are also organised differently, with an increased focus on intelligent, people-based design to suit residents' needs. For example, the Australian Commonwealth Government's *Smart Cities Plan* focuses not only on leveraging digital technology, but also human and social capital, for example, through identifying job clusters, increasing housing supply near those clusters, and improving transport connections.¹⁸

Smart city developments have the potential to change Adelaide through enabling efficiency gains across the city. Data can improve traffic management and transport options, improving mobility and travel time across the city. Data-driven decision-making can also enable better investment and policy decisions at a governance level. Smart city concepts may also impact Adelaide's accessibility and liveability for residents, and productivity for businesses.

¹³ Renewal SA, Lot Fourteen (2019) <<https://renewalsa.sa.gov.au/projects/lot-fourteen/>>

¹⁴ Deloitte, *Smart Cities: How rapid advances in technology are reshaping our economy and society* (2015) <<https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/publicsector/deloitte-nl-ps-smart-cities-report.pdf>>.

¹⁵ Deloitte, *Innovations in commercial real estate: preparing for the city of the future* (2017) <<https://www2.deloitte.com/content/dam/Deloitte/us/Documents/Real%20Estate/us-innovations-in-commercial-real-estate.pdf>>.

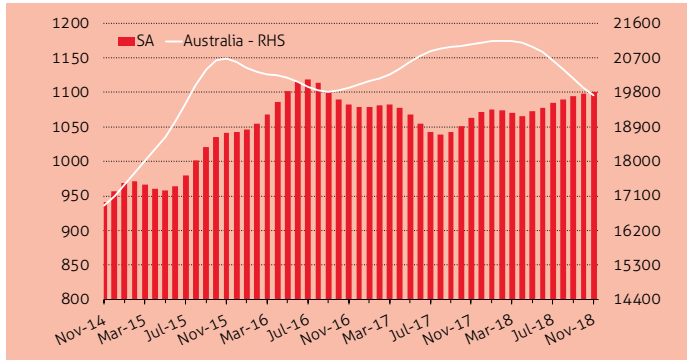
¹⁶ *Information Age, IBM, Cisco and the business of smart cities* (2012) <<https://www.information-age.com/ibm-cisco-and-the-business-of-smart-cities-2087993/>>.

¹⁷ Deloitte, *5G mobile – enabling businesses and economic growth* (2017) <<https://www2.deloitte.com/au/en/pages/economics/articles/5g-mobile.html>>.

¹⁸ Department of the Prime Minister and Cabinet, *Smart Cities Plan* (2016) <<https://cities.infrastructure.gov.au/smart-cities-plan>>.

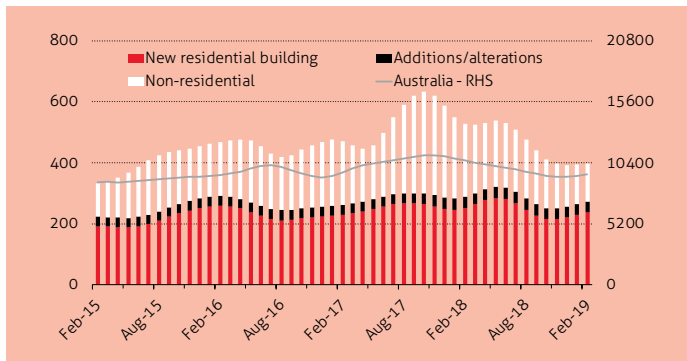
Statistics

CHART 1
SECURED HOUSING FINANCE COMMITMENTS - TREND (\$M)



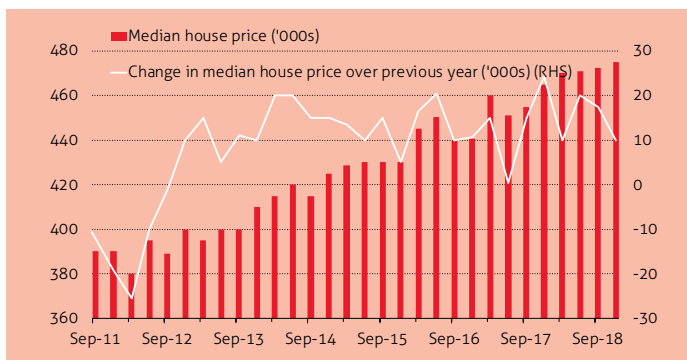
Housing finance commitments in South Australia are increasing again, albeit a modest upturn, from a small dip in early 2018. This is the highest commitments have been since mid-2016. The same cannot be said nationally – housing financing has decreased since mid-last year. This cooling down period in the housing market may still flow on to South Australia, given that NSW and Victoria have led this housing cycle, with other states following.

CHART 2
BUILDING APPROVALS - TREND (\$M)



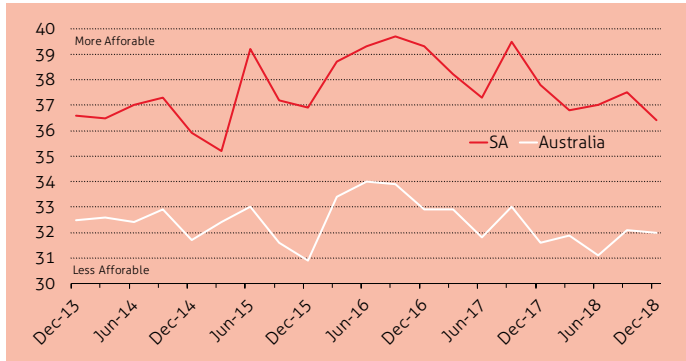
The value of local building approvals has fallen in recent months in South Australia, mainly due to decreases in commercial construction ('non-residential building') approvals. However, previous gains should continue to support work underway over the coming year. Additionally, residential building approvals have plateaued, with more difficult conditions to fund new construction activity.

CHART 3
MEDIAN PRICE OF HOUSES SOLD - ADELAIDE (\$'000)



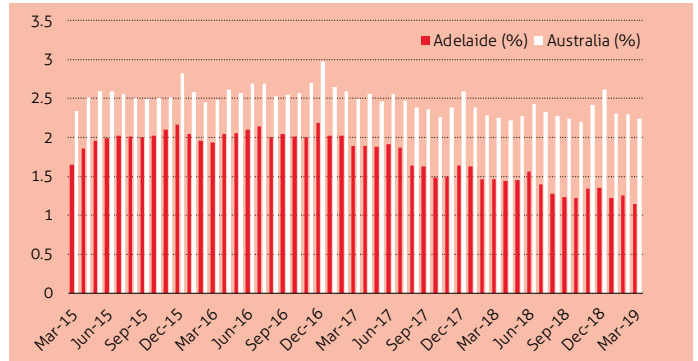
Solid growth in the housing market has continued into its sixth year in South Australia. Prices in Adelaide have continued to rise whilst prices in many of the other capital cities have decreased. This is the result of a squeeze on loan approvals, which has seen a fall in the rate of new housing finance across Australia. Housing prices in South Australia, as with other housing indicators, might be lagging behind the national trend, but given the tighter lending conditions, falling house prices may still be on the horizon.

CHART 4
HOUSING AFFORDABILITY - INDICATOR STATISTIC



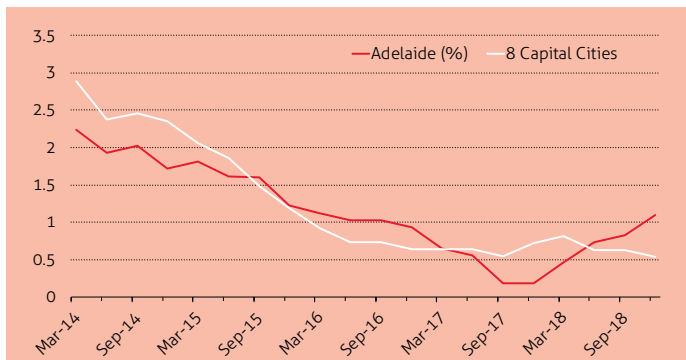
The last year has seen a moderate decrease in the affordability of housing in both South Australia and across the nation. In saying this, South Australia has remained far more on the affordable end of the spectrum. The proportion of income spent on loan repayments in South Australia has risen in the December quarter, sitting at 27.5%. As wage growth in South Australia has been relatively stagnant, the increase in the proportion of income spent on loan repayments will put additional pressure on mortgage owners.

CHART 5
RENTAL ACCOMMODATION VACANCY RATE



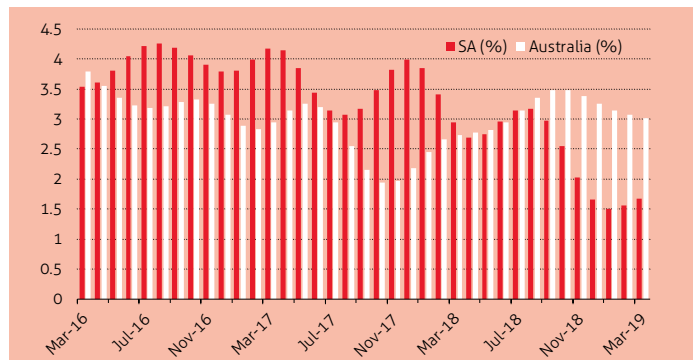
Late last year, the national vacancy rate fell to below 2.2%, its lowest level in four and a half years. The South Australia vacancy rate sits well below this level, despite a marginal increase in the December quarter. Adelaide currently has some of the tightest vacancy rates in the country – only sitting behind Hobart and Canberra.

CHART 6
INDEX OF DWELLING RENTS - % CHANGE ON PREVIOUS YEAR



Dwelling rents in South Australia have been on the rise since late 2017 after a long period of easing, in line with a decline in rental stock availability and the low vacancy rate. This goes against what is occurring in the other capital cities, which have seen easing rates of growth in dwelling rents since early last year.

CHART 7
RETAIL TRADE - % CHANGE OVER PREVIOUS YEAR - SEASONALLY ADJUSTED SERIES



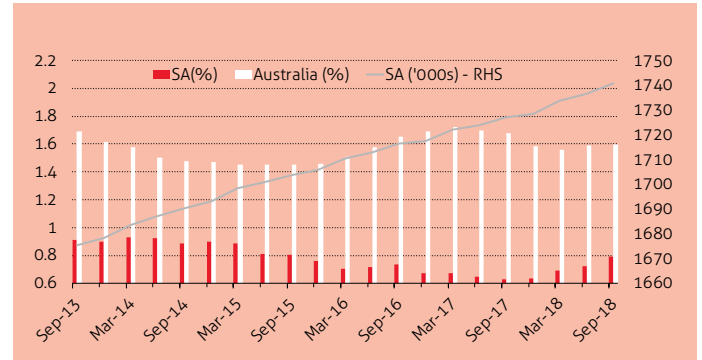
The rate of growth in retail turnover in South Australia has fallen significantly behind national growth - a stark contrast to previous years. The rate of growth in South Australia has however increased in March, bucking the national trend which has seen a continued decrease in the rate of retail turnover. While recent growth in South Australia's retail trade still pales in comparison to last year's performance, it should be noted that South Australia saw substantial growth in retail trade last year. There is hope that retail will continue to increase in South Australia, with the delivery of income tax cuts and interest rate relief. Retail trade growth across the nation has moderated, with declining property prices in Sydney and Melbourne a key driver of this.

CHART 8
RETAIL TRADE BY SECTOR - % CHANGE MARCH 2018 TO MARCH 2019 - TREND



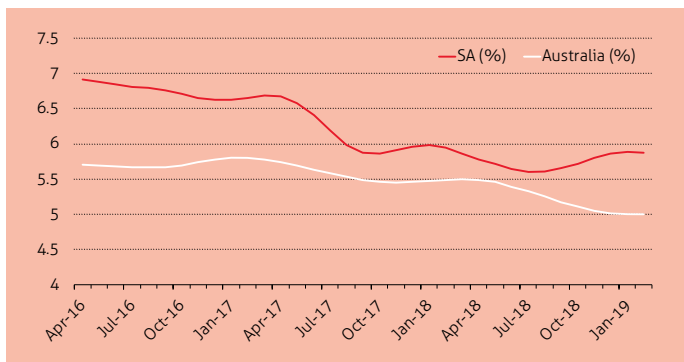
A breakdown of the retail sector provides an insight into spending across the different sub-categories. Growth in hospitality, household goods and other retailing mitigated a large decrease in spending in the clothing and soft goods category. Overall, total retail trade has increased by almost 2% on the previous year. South Australia out-performed national retail growth in other retailing in the last year, but is lagging behind in all other sectors. Chart 7 shows a moderation in retail trade growth in South Australia from August last year, which has been reflected across all sectors.

CHART 9
POPULATION TRENDS - % CHANGE ON PREVIOUS YEAR AND LOCAL LEVEL ('000S)



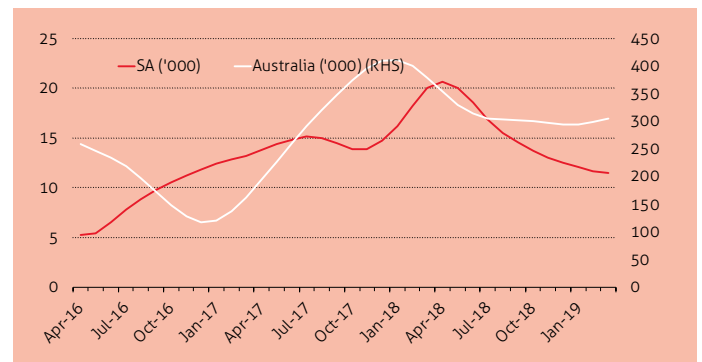
Population growth in South Australia appears to be on the rebound after a weak few years. A key issue for South Australia remains the brain drain of young professionals moving interstate. A steady birth rate and international migration are helping to offset this outflow. The longer-term prospects for the South Australian population may be more prosperous, as the State Government looks to introduce a visa program that will encourage international students to make a permanent shift to South Australia.

CHART 10
TREND UNEMPLOYMENT RATE (%)



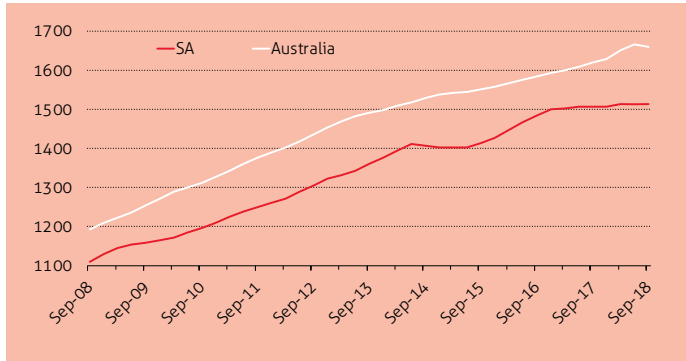
The unemployment rate in South Australia has stabilised after increasing marginally from mid-2018, and is now sitting at the highest rate since April 2018. The increase in the unemployment rate since December last year can be attributed to an increase in participation rate rather than to outright job losses. Conversely, the national unemployment rate has fallen to its lowest level in eight years, which has been driven by a steady rate of job gains.

CHART 11
EMPLOYMENT - NET NUMBER OF NEW JOBS OVER THE PAST YEAR



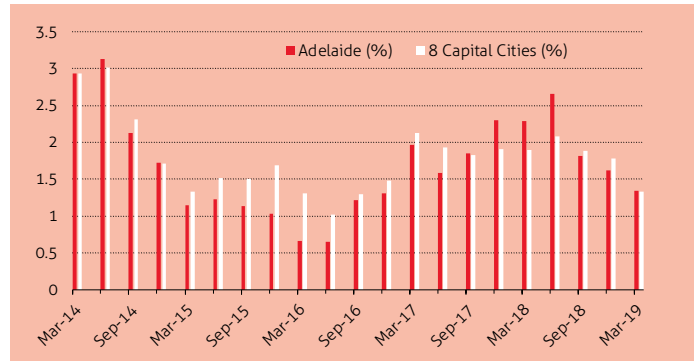
The above graph shows the net number of new jobs over the past year for South Australia and Australia. Since April last year, the number of new jobs compared to the previous year has decreased. In saying this, South Australia is at a record high in terms of the number employed. Additionally, it is estimated that three quarters of those currently employed are working full time. Over the next four years nationally, the number of jobs is forecast to increase by 7.1%, mainly driven by increases in construction, healthcare and assistance, education and training and professional, scientific and technical services.

CHART 12
TOTAL AVERAGE WEEKLY EARNINGS (\$) PERSONS IN FULL-TIME EMPLOYMENT



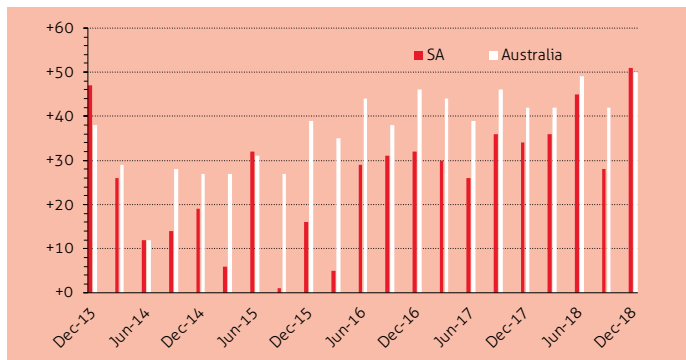
Average earnings in South Australia continue to grow, although at a slow pace. There has been very little growth in average weekly earnings in the state for the last two years. Although housing in South Australia sits amongst the more affordable, flat earnings growth can still make the repayment equation difficult for those contemplating entering the housing market. Nationally, wage gains are still very weak, but job gains are solid, and very strong in some areas. Over time, that labour market pressure is expected to drive wage growth to a higher rate.

CHART 13
CONSUMER PRICE INDEX, ALL GROUPS - % CHANGE ON PREVIOUS YEAR



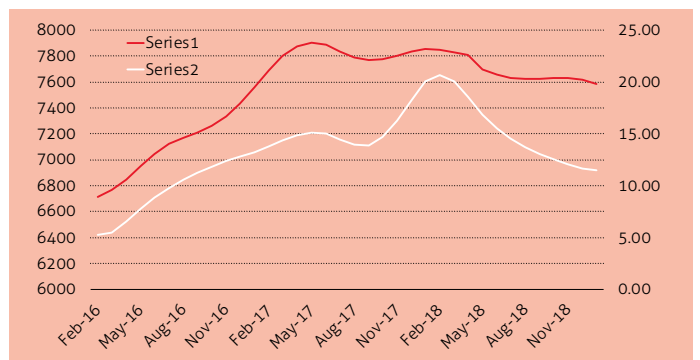
Inflation has decreased substantially in South Australia as of late, a trend observed nationally as well. The decrease in year on year inflation since mid-last year is as the result of decreasing utility prices, and childcare and housing costs across the state. From 2017 to 2018, across the nation the inflation rate remained relatively stable until last quarter which saw a substantial decrease.

CHART 14
SMALL BUSINESS CONFIDENCE - NET BALANCE



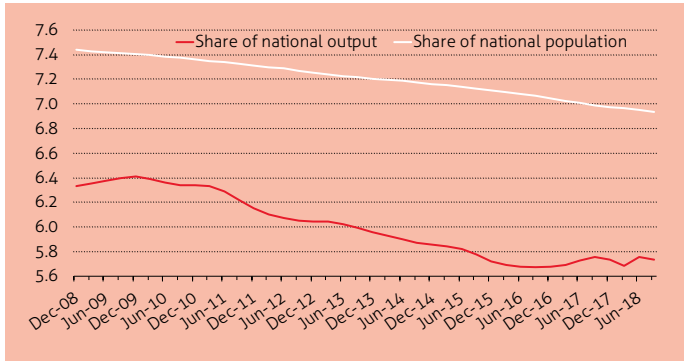
Small business confidence has increased since June last year, surpassing the national level. The increase in small business confidence is reflected in the recent strength of business investment, a key contributor to South Australia's economic growth over the past year. The increase in small business confidence appears to come mainly from an increase in confidence of the hospitality industry; this is despite small businesses across the nation currently viewing the economy as at a standstill.

CHART 15
EMPLOYMENT GROWTH & JOB VACANCIES



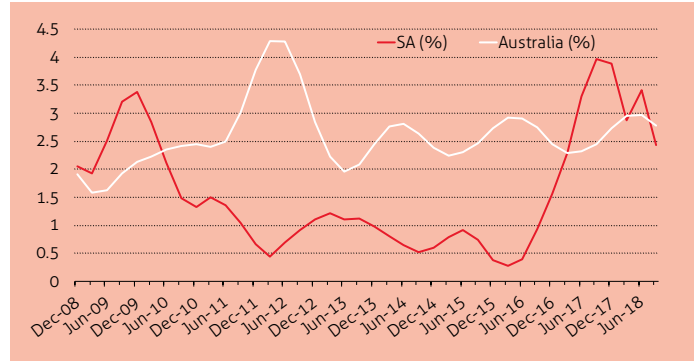
Interestingly, although job vacancies have stabilised in recent years, the rate of employment growth has decreased. This indicates that although there are jobs available, they are failing to be filled. That suggests that new jobs growth is not broadly based, but rather confined to key sectors, with select skill sets required. These skill sets are proving difficult to find, even in an environment where there is still a considerable amount of unused labour (unemployed and underemployed).

CHART 16
SOUTH AUSTRALIA - SHARE OF NATIONAL OUTPUT AND POPULATION (%)



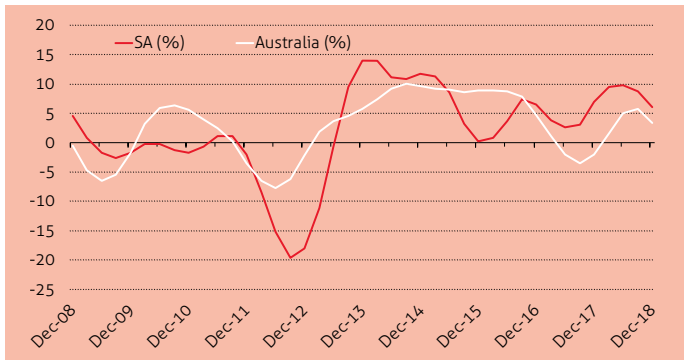
South Australia’s share of the national population continues on a downward trajectory. The outflow of the young to neighbouring states, an ageing population and little international migration are all placing a handbrake on the state’s economic speed limit. As noted earlier, changes to visa requirements to attract more international migrants to the state may help to mitigate this. In line with the population trends, South Australia’s share of national output continues a general decline.

CHART 17
OUTPUT - % CHANGE ON PREVIOUS YEAR



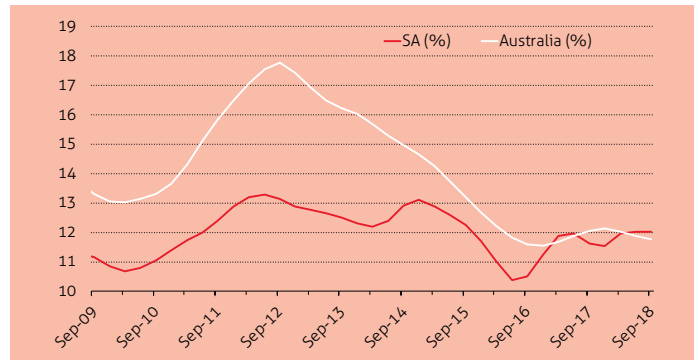
The impressive rate of output growth in South Australia exhibited between late 2015 and the end of 2016 has not continued. The more recent moderation in output growth in South Australia is largely driven by a decrease in year-on-year dwelling investment, despite an increase in year-on-year business investment. As with the South Australian economy, national output growth can also be notably affected by the highly cyclical property sector.

CHART 18
DWELLING INVESTMENT - % CHANGE ON PERVIOUS YEAR



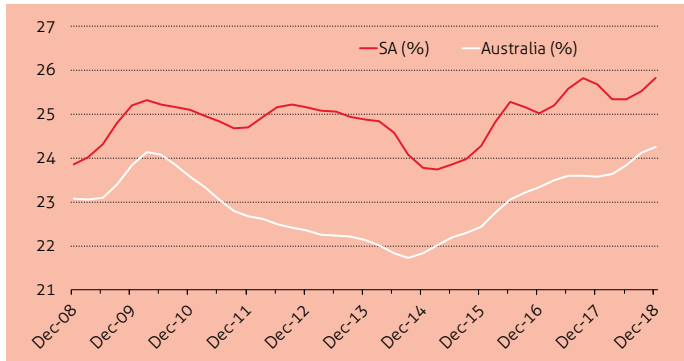
Spending on housing (including alterations, additions and other improvements) has decreased in the last six months, both in South Australia and nationally. The downturn in investment in housing may partially explain the decrease in output, as historically housing investment has played an important role in the economy.

CHART 19
BUSINESS INVESTMENT - % OF OUTPUT



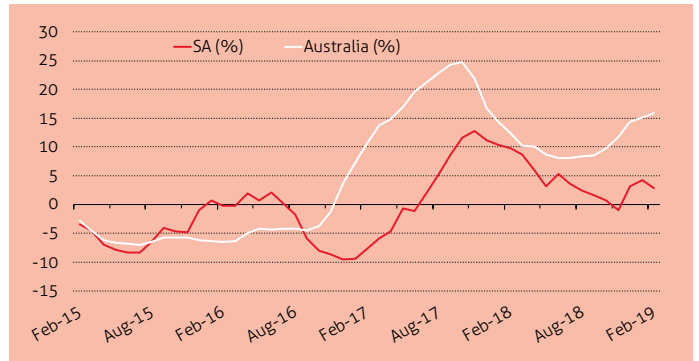
Business investment in South Australia in the past several years has remained relatively stable, hovering at a growth rate of around 12% of output. This is in large part due to improved business confidence. Nationally, business investment as a proportion of output has continued to fall slightly in recent quarters. It should be noted that this relatively stable growth in business investment is still considered relatively high historically, and that the growth in business investment leading to the peak in June 2012 is the highest level of business investment (as a percentage of output) growth recorded for South Australia.

CHART 20
PUBLIC SECTOR OUTPUT - % OF TOTAL CONSUMPTION AND INVESTMENT



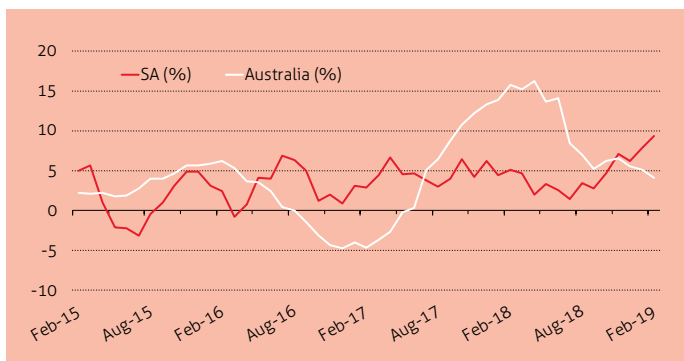
Since 2014, both state and national public sector spending as a proportion of consumption and investment has generally increased, indicating that the public sector continues to grow more rapidly than the private sector. South Australia continues to track well above the national public sector share of consumption and output. This is expected as South Australia traditionally has a large public sector given the smaller population base, spending big on health care (to support an older population). Public sector spending is predicted to increase in South Australia, as the Marshall government has recently announced planned improvements to public transport, including upgrading rail infrastructure, and a drug education package.

CHART 21
MERCHANDISE EXPORTS - % CHANGE LAST TWELVE MONTHS TO PREVIOUS



Whilst growth in merchandise exports has been increasing nationally since mid-last year, the reverse is occurring for South Australia. Nationally, the increase in exports growth is partly driven by an increase in commodity prices. South Australia's exports generally come from the agricultural sector, ranging from wine to wheat and to some extent metals and petroleum. The drought has played a role in some areas to limit production.

CHART 22
MERCHANDISE IMPORTS - % CHANGE LAST TWELVE MONTHS TO PREVIOUS



South Australian merchandise imports growth has continued to increase in recent months due to large construction projects on the energy front, as well as sustained commercial construction. Nationally, imports growth has eased back of late due to slowing spending momentum driven by more cautious customers and the winding up of huge gas projects.

MIT Professor Alex "Sandy" Pentland (front, seated) flanked by BankSA artificial intelligence specialist Irene Prodromou, Optus Business Vice President Simon Vatcher and BankSA CEO Nick Reade.

Picture: Tricia Watkinson, News Limited.

bankSA
Let's do this.



Big data promises new insights to grow state.

As part of BankSA's strategy to be a catalyst for growth, we're proud to announce our latest investment in South Australia.

In an Australian first, the South Australian Government will bring a Living Lab to Adelaide's innovation precinct, Lot Fourteen, with BankSA as Principal Partner.

World-leading university, Massachusetts Institute of Technology (MIT), will be an integral part of the Living Lab which will use big data and insights to uncover key actions to grow our state's economy.

The Living Lab will bring together the public, private and research sectors, with technology partners Optus Business and DSpark, to analyse important issues for the state, such as tourism, sustainable population growth and other economic opportunities.

"We need to identify the right interventions to help our economy grow and the power in the Living Lab lies in being able to pinpoint what the roadblocks are, and generate valuable insights to propel the state forward. We've seen the success of this approach in the work these labs have undertaken overseas in cities such as New York, Istanbul and Beijing."

Nick Reade, BankSA CEO.

Trends September 2019

BankSA believes that the material within is correct and not misleading, but gives no warranty in relation thereto and disclaims liability for all claims against BankSA, its employees, agents or any other person, which may arise from any person acting on the within material.

Not to be reproduced in any form without the written permission of BankSA – A Division of Westpac Banking Corporation ABN 33 007 457 141 AFSL and Australian credit licence 233714.

PRINT POST APPROVED 565001/00271

NOT TO BE PHOTOCOPIED.

Published by BankSA, 97 King William Street Adelaide 5000. Copyright reserved.
BSA07870 (09/19.)



banksa.com.au